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The Chemical Age

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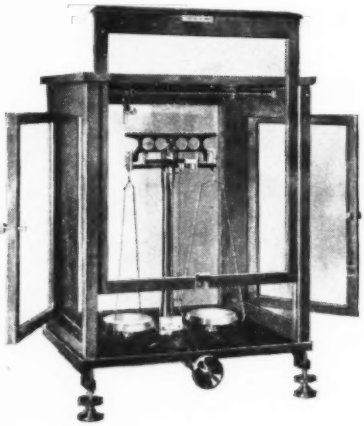

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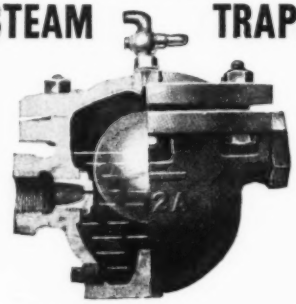

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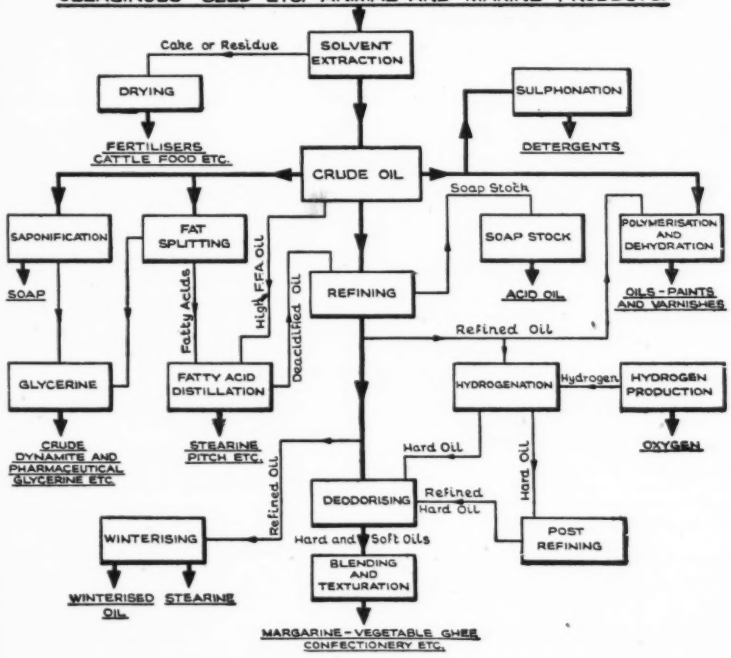

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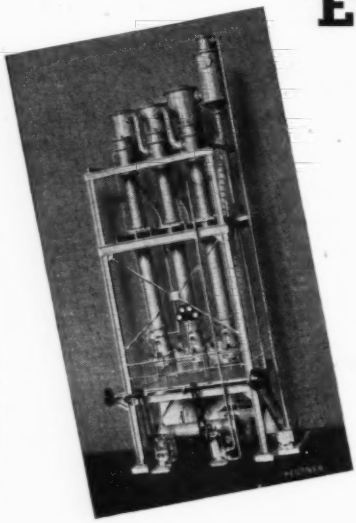

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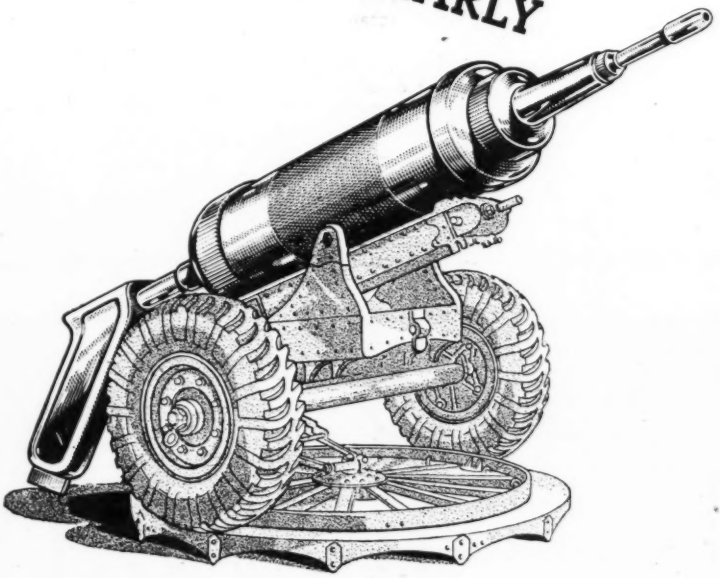

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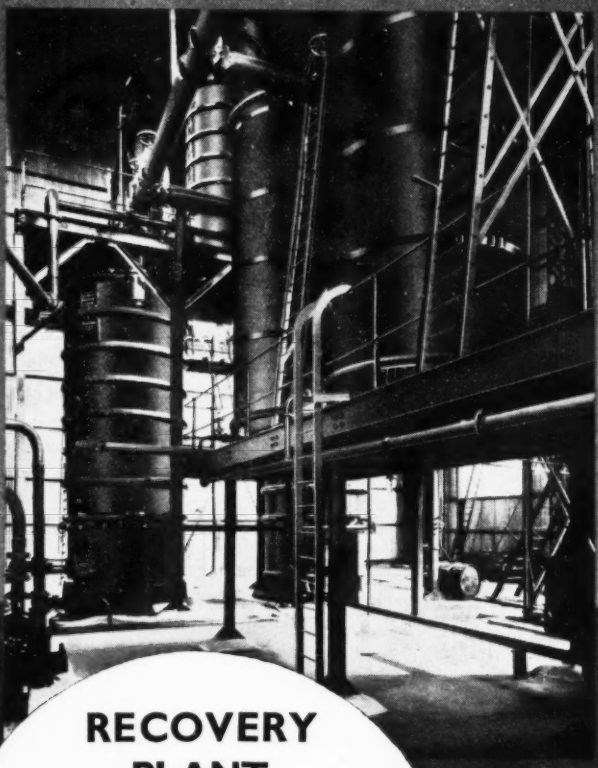

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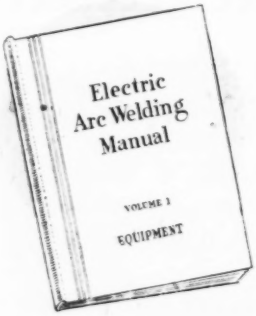

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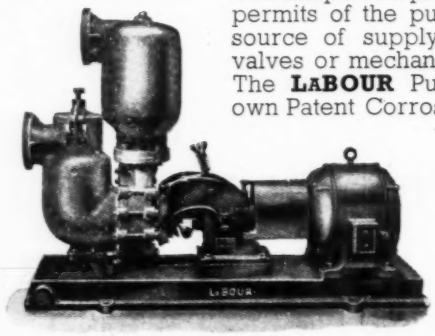

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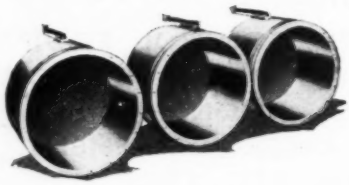

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Efficiency of Production

THOSE with the least amount of real knowledge are apt to express their opinions with the greatest degree of assurance. Employees with no knowledge of management are often too quick to pillory the management for its supposed mistakes. Scientific workers who have not been entrusted with the conduct of business are sometimes known to regard their own opinions, on such matters as public *versus* private ownership, cartels, profits, and salesmanship, as carrying immense weight. This, however, is the day of the expert, and where the expert has solid reasons for caution, it is unwise for the layman to rush in with views that can only have been formed on incomplete data. The Government's policy on unemployment has met with a large measure of approval; its objectives may be said to command universal approval, but there is room for debate upon the measures to be adopted to secure them.

It may be that the success of the policy will depend upon the ownership of businesses. It is quite legitimate to raise the issue as to whether a higher degree of employment can be secured through private enterprise or through public ownership, the latter being a means whereby we all pay each other's salaries and wages, and guarantee to do so whether the business prospers or not. Likewise there is room for argument on the relation between exports and home employment; the degree to which we shall need exports is not certain, though it is safe to say that a much larger export trade will be necessary after the war than before. It is very much a matter for experts to determine how far employment is conditioned by financial policy. But over-riding all these questions, as Sir George Schuster pointed out in the debate in Parliament, is the necessity for high efficiency in industry and in industrial processes.

We are committed to a greater programme of social reform than has ever been proposed before. We must attempt to provide higher remuneration and shorter hours for workers in productive industry; to give family allowances; to increase old-age pensions; to augment unemployment allowances; and to undertake an enormous programme of rehousing and town planning. Failure to achieve any of these objectives might well result in grave discontent. They are all worthy ends—provided that we can afford them. Some,

On Other Pages

Notes and Comments	73
Ammonium Picrate	75
New Measuring Instruments	76
Tall Oil	77
Resin-Impregnated Wood	77
Surplus Stores	78
East African Research	78
Society of Chemical Industry	79
Melting Pitch Linings	80
The Chemical Outlook in Spain	81
British Chemical Patents in Germany	84
Personal Notes	86
New Control Orders	86
British Chemical Prices	87
General News from Week to Week	91
Forthcoming Events	93
Commercial Intelligence	93
Company News	93
New Companies Registered	93
Stocks and Shares	93

like re-housing we must undertake come what may. Others are permissive in that they cannot be achieved unless the financial means are found. Obviously the financial means must be found, that is not permissive if we are to remain a united and contented nation. We have also undertaken to provide far more education for young and old; and here, again, the nation must pay the cost; for to neglect education is something that we cannot afford. It seems clear that we must maintain larger armed forces than ever before in times of peace: we have heard the last of the disarmament policy that led to the present war. Agriculture and research must be financed on a massive scale; and these, too, will need money. Finally, we must produce goods for export to pay for our imported raw materials.

Argue how we will, we can only pay as we earn. There is no bottomless public purse from which money can be found for any and every scheme. Our expenditure must be balanced by our income. How are we to get the money? Obviously through making profits from our industry. We cannot compel the foreigner or the Dominions to buy our products, nor do we wish to do so. Clearly, therefore, British goods must compare favourably in price and quality with those of other countries. There is only one way to do this—by maintaining the highest efficiency of production. This involves (1) giving British industry a fair start after the war; (2) keeping up the quality of whatever we have to offer by research, the purposes of which include the discovery of new products and processes and of better ways of doing known things; (3) ensuring that new discoveries are utilised by industry; and (4) employing in industry the best brains of the nation under conditions that will enable them to give their best, and seeing that our workers of every grade are educated to an adequate standard.

In the plans that are being formulated for social services and re-housing, there is no mention of industry. We are proposing to rehabilitate Europe—and it is clearly our duty to rehabilitate our Allies who have suffered so grievously—but we do not seem to have heard much about rehabilitating our own industries. In giving consideration to the problem of ensuring that discoveries are utilised by industry we cannot do better than quote the substance of a report recently issued by Nuffield College (*Problems of Scientific and Industrial Research. A Statement*; Oxford University Press). In some industries especially dependent on science in their everyday processes large collective research laboratories are desirable; in other industries it is better to diffuse research work widely among many small units. Small firms, unless highly specialised, are usually best served by collective research associations or by Government research institutions. But a great deal of the applied research done by such bodies has hitherto lain dormant because of the sheer inability, financial or intellectual, of the firms for whom the work was undertaken to put it to practical use. Finally, the Nuffield report affirms that there is no irremediable shortage of persons capable of original work or high competence in the field of science, but a large proportion of potential ability has been allowed to run to waste, chiefly through a defective educational system.

British industry has not been efficient in the past. The iron and steel industry was anything but efficient 25 years ago, but it has pulled itself together now, even though something remains to be done. The activities of the Ministry of Fuel and Power have revealed astonishing shortcomings in knowledge and in practice of fuel utilisation in industry generally. There is still a great deal of rule-of-thumb, and of methods used because no other method has ever been used. There is obsolete plant that is due for replacement, and there should be greater readiness to replace the obsolescent by the modern. Not only is the best equipment needed, but an intelligent watch should be kept to find something still better. Industry itself must take the major share in all this. That involves the employment of staff of high competence coupled with an enterprising policy on the part of directors; the Chancellor of the Exchequer must also be sympathetic. Finally, to revert again to the Nuffield report: "Over a far wider field the Government should be constantly watching for new scientific developments of economic or social value and should be prepared to take the initiative, in default of private industry, in exploring new ideas on a scale larger than that of the laboratory."

NOTES AND COMMENTS

John Dalton

NEXT Thursday, July 27, is the centenary of the death of John Dalton, whose atomic theory was a vital contribution to the development of modern chemistry. Examination of the composition of marsh gas and ethylene gave him the clue which led to his observation that, when two elements combine in different proportions, these proportions may be expressed in simple multiples of whole numbers. It was facts of this kind that led him to suppose that matter is composed of atoms, all the atoms of one particular element being identical in size and weight, though differing in both particulars from the atoms of all other elements. This hypothesis explained the Law of Constant Proportion established by Proust, and the Law of Multiple Proportion formulated by Dalton himself. It also met the facts covered by the Law of Reciprocal Proportion. His theory provided the logical starting point for the attempts to determine atomic weights. Though confusion was introduced into this development owing to the conceptions of "atomic weight" and "equivalent weight" getting mixed to the extent that it was not until the second half of the 19th century that the tangle could be unravelled, the value of Dalton's work cannot be over-estimated. Dalton's theory was first made known to the world at large by Thomas Thomson, in the third edition of his *System of Chemistry*, published in 1807, while Dalton's own account appeared in 1808 in his *New System of Chemical Philosophy*.

International Abstracts

DURING the year Mr. Wallace P. Cohoe has held office as president of the Society of Chemical Industry, the chemical profession has had a worthy spokesman, and we are sure that many of the ideas which he put forward in the address from which we quote on another page will find widespread approval. One particularly encouraging aspect is the close parallel between his views and those of British scientists and technicians. For instance, his words about the duty of the Fifth Estate "to cease giving their entire attention to *things* . . . and to realise that the cause of humanity may best be served not in the cloistered laboratory alone, but also by a co-ordination of human activities with organised knowledge," could be matched many times over by recent remarks of speakers on this side of the Atlantic. This sharing of common hopes and beliefs provides the soil from which joint action can spring, and a particular matter with regard to which the need for international co-operation is now recognised in the publication of abstracts. As Mr. Cohoe expressed it, "There is at present an unnecessary, useless, and wasteful duplication. It is my hope that some time in the near future the chemists of English-speaking countries will have one abstract journal covering the world's literature." We endorse that criticism of the existing state of affairs and we are glad to learn that America is ready to collaborate in abolishing the duplication. British chemists have been talking for many months about the possibility of starting such a journal and there is little doubt that they will be more than ready to follow up Mr. Cohoe's hint that the time is now ripe for common action in this matter.

Fuel Supplies

ALTHOUGH the Minister of Fuel and Power, in the debate on coal in the House of Commons last week, described the current production of coal as "acutely disappointing," he provided members with a considerable quantity of interesting information to show that his Ministry had not been supine in its dealings with the question. Chemists and chemical engineers may be fully conversant with the work that has been going on regarding the interrelation of coal and oil, but we think Major Lloyd George was justified in saying that the extent to which coal and oil had been able to assist each other was not generally realised. He cited the conversion of many industrial boilers and other plant from oil to coal and coke burning at the beginning of the war, and their reconversion back to oil when the supply position changed. Another illustration of the relief given to coal supplies was the use of gas oil for making water-gas, which saved nearly 500,000 tons of coal during last winter. The

Minister also stressed his department's activities with the Fuel Research Board in a full examination of the problem of producing oil from coal, while he described the large-scale use of home-produced creosote pitch in substitution for imported fuel oil as the greatest replacement of domestic for foreign fuel that the country had seen. The vast increase in production of benzol is also notable. This benzol, the Minister said, was not used, as before the war, for motor spirit, but largely as a component of aviation spirit and as a source of toluene for explosives.

Underground Gasification

A SPECIAL plea for starting, or at any rate experimenting in, the underground gasification of coal was made, later on in the same sitting, by Mr. David Grenfell. As a corollary to the working of outcrop coal (which Mr. Grenfell, as Minister of Mines, started in 1941), he pointed out that there are certain seams of coal which are too deep to be worked by the outcrop method, even if the overburden is removed by mechanical diggers, and too shallow to mine by ordinary underground methods. Here, Mr. Grenfell claimed, was a fine opportunity for trying out something that had been done in Russia by gasification, *in situ*, with wonderful results. He cited the deposits at Keltie, Fifeshire, where the coal is covered by peat bog, and at the Orchard Colliery, Warwickshire, where a number of seams come very near the surface on a narrow anticlinal ridge. There was no reason at all, he said, why we might not get a better example of underground gasification there than anywhere in America. We had failed to maintain production by old methods, and the Minister and the Government must seize their opportunities and show more enterprise. The economics would look after themselves, he averred, if a proper study of them was made. From the Fuel Minister's own figures it is quite plain that some drastic action is necessary, and Mr. Grenfell's practical experience at least indicates a direction in which such action could possibly be applied.

Markets for Dyestuffs

A USEFUL article on potential post-war markets for dyestuffs appeared recently in *Foreign Commerce Weekly*, the American journal that puts all the publications of the Board of Trade in shame. Before the war Germany took up 52 per cent. of the world export market for this range of commodities, the rest of the supplies being provided by Switzerland (11.3 per cent.), Japan (10.4), the United States (10), Britain (8), France (6), Italy (1.4) and Czechoslovakia (0.7). The position after the Armistice will be very different. *Foreign Commerce Weekly* expresses the view that by 1948 Germany will be producing only sufficient dyes to meet domestic requirements, and will have no exportable surplus; Italy will be approaching pre-war levels, and so will France. There will thus be gaps in the world market to fill, as, for instance, in India, where nearly 70 per cent. of the 15,000,000 lb. of dyes imported each year used to be obtained from German sources. America expects to move in, and this article suggests that out of an annual production of 250 million lb. which should materialise by 1948, one-sixth should find foreign outlets. A large proportion of that would find its way to South America, and in particular Brazil, while the Americans will almost certainly capture an important part of the European and Far-Eastern markets.

A Question of Service

THE article concludes by indicating those features which distinguished the German traders, the kind of service they used to offer and hence the steps which must be taken by Americans seeking new markets. The work and responsibility of the manufacturer, it is pointed out, does not end with the sale of his product, and he must be ready with his laboratories and experience to co-operate with the trade, whether it be in recommending counter-offers to competing products or solving problems in dye application. German dyes were not superior to those made in several other countries, but until recently Germany supplied a wider range of products, particularly in the field of anthraquinone dyes for cotton. The Germans were generally more liberal in respect of stocks and also credits than their competitors. We wonder whether the Board of Trade has equally shrewd ideas about reaching the overseas markets that will undoubtedly exist for dyestuffs.

Ammonium Picrate

Production for Military Explosives

IN the last war ammonium picrate was the secret high explosive of the United States and was known as "Explosive D." The present American programme for this product was started in 1940 as an ordnance project and has involved erection of new buildings, installation of machinery and equipment, and training of operators. Two methods are being used for the production of this important explosive; one starting with phenol as the raw material, the other with dinitrochlorobenzene. The latter process is described in the following pages, adapted from an article by Col. T. C. Gerber, Ordnance Department, U.S. Army (*Chem. Met. Eng.*, 1944, *51*, 3, 100).

From the standpoint of explosive strength alone, ammonium picrate is inferior to T.N.T., but it is important as a military explosive because of its marked insensitiveness to shock and friction. It is this latter property which makes it well suited for use as a bursting charge in armour-piercing shells, in projectiles for coast artillery and in other types of projectile which must withstand severe shocks and stresses before detonating. Like T.N.T. and picric acid, ammonium picrate liberates free carbon on explosion, giving a black smoke. The products of the explosion, although more disagreeable in odour, are less poisonous than those from T.N.T. and picric acid, in that they contain less carbon monoxide.

Ammonium picrate is a light yellow powder which will not melt on heating, but if raised to a temperature of 300°C. will decompose with explosive violence. Loading is therefore accomplished by pressing or tamping the powder into the projectile. It has only a slight tendency to absorb moisture, but if it does become wet, it can form sensitive and dangerous picrates with copper and lead. No explosive compounds are formed with steel, but in order to avoid corrosion, the interior of the shell is coated with a suitable non-metallic paint or varnish before it is filled, and a moisture-proof seal is provided at the base of the projectile.

To summarise the process used in some of the Government-owned, contractor-operated facilities programmes, dinitrochlorobenzene (DNCB) is hydrolysed with a hot aqueous solution of caustic soda, the resultant sodium salt of dinitrophenol (DNP) is precipitated by sulphuric acid, and the DNP itself isolated as a wet filter cake. This filter cake is slurried with strong sulphuric acid and nitrated to picric acid (TNP) by means of mixed acids. The TNP is filtered, neutralised with aqua ammonia in hot aqueous solution and crystallised as ammonium picrate (AP) which is filtered and dried. Standardised equipment for the manufacture of ammonium picrate by the DNCB process accommodates a batch size which is equivalent to 1250 lb. of ammonium picrate, provided optimum process yields are obtained.

Hydrolysis

The hydrolysis of DNCB is carried out by charging water, caustic soda solution, and molten DNCB to an agitated cast iron kettle. After closing the kettle and venting it, steam jets are used to heat the contents to 70°C., the heat of reaction taking the temperature up to 100°C. without further use of steam. On slackening the reaction rate, the entire batch is boiled for about half an hour, after which it should still be alkaline to phenolphthalein.

While the kettle batch is in progress, a wooden vat is charged with 5600 lb. of water and 340 lb. of 97 per cent. sulphuric acid, the mixture then being agitated and heated to 75°C. with open steam. The completed hydrolysis batch is then blown by steam pressure through a preheated transfer line to the vat, where the final mixture must give an acid reaction with Congo red paper. Sudden drowning of hydrolysed DNCB in sulphuric acid results in a fine precipitate of DNP, which must be digested and converted to coarse granular crystals.

Atmospheric cooling aided by agitation lowers the temperature of the slurry to 80°C., further lowering of the temperature to 40°C. being accomplished through use of cooling water in the coils. DNP crystals are then separated from the mother liquor by filtration on a wood vacuum filter and washed with water to remove excess chloride. The moist filter cake is heated to 90°C. and again dried by vacuum. After as much moisture has been evaporated as possible, the DNP filter cake is lowered into boxes for temporary storage and subsequent transfer to nitrators. Analysis of the DNP for strength must reveal a melting point of 111°C. or higher.

Nitration

Each batch of DNP is nitrated individually to form one batch of TNP. Prior to nitration, the DNP is slurried with sufficient sulphuric acid to give a fluid suspension of whatever solids are present at the temperature prevailing during nitration. The acid must also be adequate in quantity to take up both the residual moisture in the DNP and the water produced by nitration without becoming weaker than 91 per cent. For DNP batches which are above 87 per cent. in strength, the minimum quantity of

97 per cent. sulphuric acid which can be employed is 3960 lb. For batches which are below 87 per cent. in strength, an additional 210 lb. of 97 per cent. sulphuric acid must be charged for each point by which the DNP strength is below 87 per cent. DNP below 82 per cent. in strength requires special handling.

Nitration is accomplished in a jacketed nitrator. One batch from the DNP filter (approximately 1015 lb. on a 100 per cent. basis) is shovelled into the nitrator through a hopper with screen bottom to provide for crushing all lumps. The temperature is then adjusted to between 35°-45°C. by admitting steam or cold water as required. Mixed acid containing 70 per cent. HNO_3, 25 per cent. H_2SO_4 and 5 per cent. H_2O is fed to the nitrator for about 1½ hr., allowing the batch temperature to rise slowly, so that at the end of the acid feed the temperature will reach approximately 95°C. For half an hour the batch is held at 95°C. and agitated, then cooled to 80°C. and diluted with 2400 lb. of previously produced ammonium picrate mother liquor. This dilution must be done carefully to avoid excessive foaming which results from too vigorous an evolution of nitrogen oxide. The batch dilution is continued, using picric acid wash water from previous batches, until a total of 6500 lb. of water has been added as diluent. During dilution, the batch temperature must not be allowed to exceed 100°C. nor to drop below 65°C.

After dilution, the batch is cooled to 35°C. and filtered, the acid filtrate being sent to spent acid storage, and the filter cake washed and dried by vacuum for about an hour. The batch production of picric acid is approximately 1212 lb. of 100 per cent. material. Acceptable TNP has a melting point of 121°C., or above, and contains no more than 0.5 per cent. sulphate as H_2SO_4.

Ammoniation of Picric Acid

Two and a half nitrator batches (the equivalent of 3125 lb. of AP) are combined to make one ammoniation. Before charging this material, approximately 3600 lb. of fresh water are added to the ammoniator and heated to 100°C. with jacket steam. Air agitation is then begun and the batches of picric acid filter cake plus aqua ammonia are added to the ammoniator over a period of 1½ hr. in such a manner that the batch remains slightly alkaline to bromothymol blue test-paper at all times. The batch is maintained at 100°C. throughout the operation and great care is necessary to ensure that all picric acid is in solution when the final adjustment for neutrality is made.

A period of 12 hours is required to cool the batch to 40°C., using automatic controllers to regulate the temperature of the jacket cooling water by external means in accordance with a predetermined cooling curve. It is essential to supply good agitation with the air agitator throughout the cooling cycle. When the ammoniator batch has reached the temperature of 40°C., it is filtered, washed with mother liquor, dried by application of vacuum for two hours and loaded into boxes for temporary storage and transfer to the dryer house. In each line the entire 24-hour production of wet ammonium picrate is transferred to the drying house on day shifts, and divided between three drier tubs. The contents of these tubs are dried by passage of forced-draught air preheated to a temperature of 70°C. When dry, the ammonium picrate is unloaded into a hopper, screened to remove material too coarse to pass specifications, and packed in the prescribed container.

Sulphuric Acid Recovery

The spent acid used to liberate DNP from hydrolysed DNCB is transferred to sulphuric acid concentration units where it is concentrated to approximately 96 per cent. strength. This concentrated sulphuric acid is then mixed with sufficient 20 per cent. oleum to produce 97 per cent. sulphuric acid for re-use in the process. It has been found that about 500 lb. of 20 per cent. oleum per 1000 lb. of AP is required to compensate for the sulphuric acid consumed in the DNP process and offset all sulphuric acid handling and concentration losses.

NEW MEASURING APPARATUS

To describe instruments for making precise conductivity measurements in plant or laboratory the Leeds and Northrup Company, 4934 Stenton Avenue, Philadelphia 44, Penna., U.S.A., has just revised its catalogue EN-95, "Apparatus for Electrolytic Conductivity Measurements in Laboratory and Plant." It should be of special interest to anyone who is considering new equipment and requires latest specifications on instruments, conductivity cells, and accessories. This revised publication presents much the same data about methods of measurement and notes for selection and use of the apparatus as did the previous edition. But, in addition, it illustrates and describes a Signalling Conductivity Controller and several new industrial cells which have since become available.

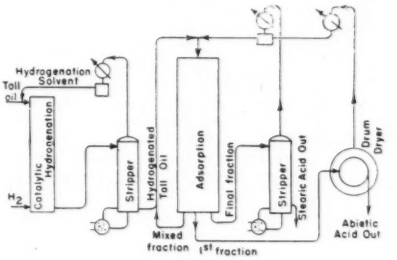
The same company has revised its Micromax Rayotube pyrometer catalogue to show how war plants have been applying such equipment to important new temperature-measuring jobs, involving, for instance, molten cast iron, electric salt pots and blast furnace stove domes. Anyone requiring a copy should write to the firm at 4934 Stenton Avenue, Philadelphia 44, Pennsylvania, asking for Catalogue N-33B—"Micromax and Speedomax Rayotube Pyrometers."

Tall Oil

Separation of Components

THE two main components of hydrogenated tall oil, stearic and abietic acids, are separated by selective adsorption using activated carbon, according to a process described by G. Papps and D. F. Othmer in *Ind. Eng. Chem.* (1944, *36*, 5, 430). Separation is accomplished by feeding an 8 per cent. solution of hydrogenated tall oil in a suitable solvent through a glass column containing activated carbon. After the hydrogenated oil is fixed on the adsorbent, the abietic acid is first washed through and out of the column by additional fresh solvent, followed by the stearic acid, which is preferentially adsorbed. The efficiency of separation and the speed of the operation depend mainly on the solvent. 1-Nitropropane proved the best solvent among twenty-nine considered. In the first 150 ml. of wash solvent, 78.4 per cent. of abietic acid, 99.5 per cent. pure, was removed. The next 250 ml. washed out the remaining abietic acid with some stearic acid, to leave 87 per cent. of the total stearic acid, 100 per cent. pure, retained in the column. The stearic acid was washed out completely by using 600 ml. of solvent; the 250 ml. of mixture would be re-cycled in the next batch, so that essentially complete separation is possible. A modified McNichol method is developed for determining the abietic acid content in mixtures.

The accompanying diagram indicates a possible flow sheet of the method. After some purification, the tall oil is hydrogenated in the presence of a catalyst and a solvent; the extraction solvent is distilled out in a short stripping column, and the hydrogenated oil is dissolved in the solvent and passed to one or more adsorption columns. Here stearic acid is adsorbed and the solvent effluent is passed through, first to carry through abietic acid and then to wash stearic acid from the carbon. The first fraction, containing abietic acid, is passed to a drum dryer to evaporate the solvent.



Flow-sheet for hydrogenation of tall oil and separation of stearic and abietic acids.

The final (stearic acid) fraction is passed to another drum dryer, stripping column, or other means of evaporating the solvent away from the acid. The intermediate fraction containing both components is re-cycled back to a point at or below the feed inlet. A patent protection is being secured on the novel aspects of this method.

Figures worked out roughly for a large-scale plant indicate that this separation process may well be economic. Should the demand for hydrogenated rosin increase, the process can be carried further to hydrogenate the abietic acid also, after the hydrogenation of the unsaturated fatty acids.

Resin-Impregnated Wood

Methylolurea Treatment

A FEW weeks ago, some rather indefinite reports concerning a new type of impregnated wood, produced in America by E.I. du Pont de Nemours & Company, filtered through to this country by way of the lay press. The details were unconvincing, and more exact news has been eagerly awaited. Some at any rate of the missing facts have now been filled in by a brief article published in *Chem. and Met. Eng.* (May, 1944, p. 132).

It is there revealed that various impregnating agents have been used to enhance the value of wood as a material for plant construction, including chemical plant, as the treatment is stated to impart marked improvement to the chemical resistance of the wood so treated. Of the various impregnating agents, the principal have been phenol-formaldehyde resin solutions, while methylolurea resin treatment offers additional interest, the principal solute, dimethylolurea, being now available (in America) on a commercial scale at an economic cost. The treated wood has been named "transmuted wood."

The method of resinifying methylolurea in the wood was developed by Du Ponts along a line of research parallel with studies conducted by the Forest Products Laboratory of the U.S. Department of Agriculture. Methylolurea resin impregnation imparts di-

mensional stability to wood and improves its strength and hardness. Veneers which are sufficiently impregnated and dried become self-bonding under heat and pressure. The flame resistance of the wood is improved and it becomes more resistant to the infestation of fungi and insects. Treated timber becomes markedly harder, stronger, and more durable. A hardened shell may be obtained by partial impregnation of construction timber, leaving the untreated inner fibres in a more resilient, flexible state to withstand impact stresses. Complete impregnation for construction purposes is not economically feasible.

Chemical attack on wood is greatly reduced by the methylolurea treatment. Wood which had been subjected to vacuum pressure impregnation was exposed to various chemical agents, including nitric, sulphuric, and hydrochloric acids, and caustic soda. The discoloration of the wood was used as a criterion of effectiveness, and in all cases a diminution of attack was noted. The treatment showed the greatest resistance to nitric acid and, after several hours in 25 per cent. solution, the wood showed little or no signs of reaction. The resistance may be further increased by subjecting the treated wood to heat and pressure, or by increasing the amount of methylolurea.

Normal timber-treating cylinders equipped for vacuum-pressure operation can be used for impregnating. Drying and polymerising can be accomplished by means of natural air or in a kiln.

Surplus Stores

Government Plans for Disposal

SOME indication of the general lines on which the Government proposes to dispose of surplus stores after the war is afforded by the Board of Trade leaflet *Government Surplus Stores* (H.M.S.O., 1d.), which has just been published. Not unnaturally the reservation is made that the policy may be modified in the light of experience and changing circumstances, or in accordance with any international agreements that may be made.

Three classes of stores which are likely to be surplus to requirements are enumerated: (i) Raw materials; (ii) Munition stores; (iii) Manufactured stores adaptable to civilian uses. Separate papers will deal with surplus buildings, land, and machine tools.

In regard to raw materials, these are controlled, and many of them bought and sold, by Government agencies; and in many cases surplus materials will become part of a Control's stocks and there will be no need for new marketing machinery. Where types of material are in substantial supply in relation to normal peace-time demands, special disposal arrangements may have to be made. Trade and other interests concerned will be consulted.

The general principles of disposal which it is intended to adopt include: (i) a rate of release which will avoid flooding the market; (ii) distribution to those traders who would normally handle the product involved; and (iii) statutory price control to prevent profiteering. These principles may prevent the sale of surplus stores by unrestricted competitive tender, and where this is so, other arrangements will be made, such as sale by negotiation or by restricted tender, or through a non-profit-making corporation, with membership open to all traders normally handling the goods concerned. Some of the surplus may be exported.

For each category of surplus goods, one department has been designated as the Disposal Department. This will usually be the Ministry of Supply, except in special cases, where the Ministry of Works, the M.A.P., the Admiralty, or the G.P.O. have been appointed. Traders or manufacturers who wish to know which department they should approach regarding disposal, should get into touch with the Board of Trade.

East African Research

Petrol from Oil-Seeds

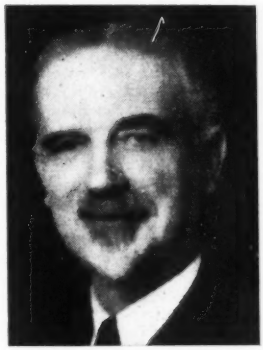
THE building of a camphor factory, which has produced 58,000 lb. of solid camphor and oil in the past year, is one of the projects surveyed by the 15th annual report of the East African Agricultural Research Station at Amani, Tanganyika Territory. An important branch of research during the year was caused by the demand for pottery utensils and containers. After prolonged laboratory experiments, suitable glazes have been found to fit local clays, and pottery is being made at Amani.

Active experiments in the production of cinchona have also been in progress, together with laboratory investigations and analyses. Under this head, too, come experiments in creosote, dehydrated castor oil, fibre boards, glycerine, stearine, African food crops, and malting barley. In connection with the last named, it is interesting to note that two commercial-scale maltings have been erected by Nairobi brewers for the utilisation of East African barleys. The lengthy investigation of producing petrol from oil seeds was completed satisfactorily and the process patented.

Various research investigations were undertaken for the military authorities, while the problem of rubber production was explored thoroughly and examinations carried out on samples of wild and plantation rubber.

Society of Chemical Industry

Annual Meeting Adjourned



Mr. Wallace P. Cohoe, Retiring President.

THE annual meeting of the Society of Chemical Industry held at the Royal Institution on July 14, was adjourned after the completion of the business proceedings and the reading of the presidential address. It is hoped to resume the meeting on October 13, and the Royal Institution has been provisionally booked for that date.

The new president, Dr. E. K. Rideal, was installed. After his election, which had been proposed by Dr. William Cullen and seconded by Dr. R. T. Colgate, he spoke of the chemical profession as being very much alive, adding that if the university and academic work were integrated with the chemical industry he did not think that there need be any fear for the future in spite of the enormous developments that had taken place in other parts of the world during the war years.

New Council Members

The meeting then elected Sir Robert Pickard and Mr. A. L. Bacharach as vice-presidents. The officers remain the same, namely: *hon. treasurer*, Dr. L. H. Lampitt; *hon. foreign secretary*, Mr. Stanley Robson; *hon. secretaries*, Dr. R. T. Colgate and Dr. H. J. T. Ellingham. New members of Council are Mr. C. G. Addingley, Mr. J. P. Baxter, Dr. J. Vargas Eyre, and Mr. J. A. Oriel.

In his report as treasurer, Dr. Lampitt called attention to the state of the post-war publication and hospitality funds. The society, he said, now had over £12,000 to start financing the much-needed expansion of publications.

After the annual report and the treasurer's reports had been unanimously adopted, a vote of thanks to the officers was passed, on the proposition of Dr. J. B. Phillips, seconded by Dr. Vargas Eyre.

The President's Address

Extracts from the address of the retiring president, Mr. Wallace P. Cohoe, were then read by Dr. Cullen. The address which had as its theme "The Service of Science" opened with a tribute to the work of Dr. Cullen. "Dr. Cullen's willingness to work has only been equalled by our willingness to have him do it and our satisfaction in the way he has done it," was Mr. Cohoe's comment. The president then proceeded to refer to Dr. Lampitt's address given at last year's meeting, and in particular to that part dealing with the need for co-operation between chemists. Mr. Cohoe referred to the importance of international co-operation with regard to the publication of abstracts which he described as at present entailing "unnecessary, useless and wasteful duplication. It is my hope that some time in the near future the chemists of the English-speaking countries will have one abstract journal covering the world's literature. I hope to see abstractors chosen from each of the countries represented in the abstracts. Through modern means of transport it will be possible to publish simultaneously in all parts of the world. In this I have every reason to believe that America stands ready to co-operate in a manner by which the identity or prestige of no existing society shall be lost. The question now is—Does England wish to co-operate? If it does then I can only say that there is a tide in the affairs of men which taken at the flood leads on to fortune."

The service of science to civilisation Mr. Cohoe considered as starting with its service to better living. Through the last three centuries science, he said, had been gradually and progressively freeing man from drudgery, but the opportunity that this exemption from drudgery gave served no useful purpose unless man used it to improve his intellectual and moral welfare, thereby making the world a better place in which to live. In considering the service of science to the State the realm of material things was left behind and we entered into the field of human relations. At once we were confronted with the fact that although our civilisation has changed, human nature stays much the same as it always had been. In making changes in his life, his work, his surroundings and his standard of living, man himself changes little. A dispassionate observer from another world might say of man that he has been given an intellect, but is controlled very largely by his emotions. This has been particularly

true in the field of politics, and in world politics the history of the last five years discloses that such emotions as unholy ambition, inordinate greed, and personal vanity are, through a false leadership, pushing civilisation towards a precipice. Viewing this situation, the first reaction of any man is to say "Stop Science." To stop science is impossible. Man has been making natural forces his servant for centuries. Since Prometheus invented fire the current of human progress has been flowing steadily. For many centuries it was a slow stream, but for the last 300 years it has become faster and faster, until to-day the tide of invention and scientific achievement can no more be held back than the tides of the ocean itself. "We are therefore confronted," added Mr. Cohoe, "with a situation which we must meet and it is the duty of those who constitute the Fifth Estate—that is to say those who produce, expound and apply that organised knowledge which we call science—to cease giving their entire attention to *things*. In the U.S.A. this Fifth Estate consists of less than 200,000 people. Upon this small group of men has depended and now depends the planning of all equipment and munitions used by the U.S. in the present war. Upon their co-operation and continued service our ability to prosecute this war depends. Upon these men and the ever-increasing number of their successors our present complex civilisation hangs. . . With more than some degree of apprehension do scientists regard the possibility of the use and misuse of unfamiliar or novel forms of energy in the future. Our apprehensions are concerned not with the employment of sub-atomic energy for the uses of peace, but we cannot look with complacency upon the possibilities of destruction involved. Agencies such as these, useful as they may be, which contain, however, the possibilities of a terrible menace, should not be released to the public domain except under the strictest control. Governments have Ministries of Science in times of war, but every nation needs this Ministry even more in times of peace. Because certain nations regard an interval of peace as a preparation for war so it is evident that a Ministry of Science should be an integral part of the Peace House in the comity of nations. International control will be a necessity because knowledge is international."

Dr. Rideal's Comments

Dr. Rideal, commenting on his predecessor's address, welcomed the suggestion about international abstracts. Thanks to the good offices of Dr. Lampitt, he said, they were slowly getting this matter on such a footing that they would be able to work in complete collaboration with the Americans. It was clear, continued Dr. Rideal, from Mr. Cohoe's address that the responsibility seemed, from the American point of view, to rest with those in Britain and not on the other side of the Atlantic. "I can only hope that the ball will not go backwards and forwards too frequently and that there will be an opportunity of meeting and seeing how both sides stands in this respect."

Melting Pitch Linings

Direct-Fired Hot-Air Unit

AN interesting method of removing the pitch linings of lager-beer barrels by a direct-fired hot-air unit, detailed in the "Industrial Gas" section of *The Gas World* (July 15, p. 58), is summarised herewith.

Empty beer casks when returned to the brewery are usually washed out with water to remove any traces of old beer. Lager beer, however, cannot be satisfactorily washed off ordinary wood barrels, and it is therefore the practice to line the casks with pitch. After the casks have been used a number of times, it is necessary to melt out the pitch and re-line them. The barrels are placed on a stage with the bung-hole pointing downwards and a nozzle is inserted in the centre of a bung-hole, from which hot air is blown up into the barrel, at a temperature of about 350°C. This melts the pitch which runs to the bottom of the barrel and is blown out through the annular space between the nozzle and the side of the bung-hole.

A local brewery, having employed an indirect-fired gas plant for this purpose with indifferent success and considerable expense, decided to make the heating unit direct-fired. Compressed air was available at 30 lb./sq. in. and it was decided to use this air, both for the air-blast burner and to eject and dilute the products of combustion.

An existing steel plate box was lined with firebrick. The nozzle mixing air-blast burner fired downwards on to the refractory floor, while the air ejector fired concentrically into the refractory venturi. The products of combustion were thus ejected, mixed with the additional air from the resultant mixture of products, and air at the required temperature passed along a wrought iron pipe and finally out through a nozzle. Chokes and orifices of suitable size were placed in the air lines, so that on turning a wheel valve, the governor opened up, passing the full gas, immediately followed by the air blast to the burner and air to the ejector. "Durex" cement made by General Refractories, Ltd., was used to make the venturi and also to protect the ejector pipe.

The unit working on this system has now been in use for over a year and is giving complete satisfaction.

The Chemical Outlook in Spain

The Sulphur Industry : Proposed New Developments

IN a recent issue of *Ion,* the Spanish Review of Applied Chemistry, Señor F. Velasco Corral briefly surveys the sulphur industry in Spain and expresses the hope that it may be substantially developed within the next few years. The mineral occurs native in certain parts of the peninsula, but the chief sources of supply are the iron and copper pyrites in Huelva and elsewhere, constituting at one time no less than 63 per cent. of the world's total of pyrites. This was the figure given in *Ingenieria y Construcción* in 1933.

The wide and varied range of uses of sulphur, both elemental and compound, are described, with special reference to its applications in agriculture, *e.g.,* in the treatment of tomatoes in the Canary Islands, where the annual consumption for this purpose may reach 3500 tons per annum. Other well-known uses include the manufacture of black powder, vulcanised rubber, and innumerable compounds largely derived from carbon disulphide; including also the use of this latter for production of sulphated olive oil and grape oil (extracted from grape mast or residue). It is used, too, in the preparation of mixed fertilisers; and more recently, as precipitated sulphur, it has found important applications in medicine. The author states that precipitated sulphur is not at present produced in Spain, but the Soc. Unión Azufrera has lately installed plant for its manufacture.

Native Sulphur Deposits

The popular impression in Spain that the deposits of native sulphur suffice to cover all national demands, is erroneous; for although these deposits are indeed sufficient for this end, if properly worked, yet, in fact, the output from this source is less than a fifth of the Spanish home demand. Until about 1930 the deficit was made good by imports from America and Italy; but since that date the home demand has been largely and mainly supplied from the pyrites smelting works of Rio Tinto. The principal deposits of native sulphur, in Murcia province, are worked by the Soc. Coto Minero de Hellín S.A., but the output here has been very low, though showing signs of some revival latterly, up to about 250 tons per month. Other deposits are worked in Almeria by the Soc. Romero Hermanos S.A. Here the output, which was about 340 tons per month in 1941 has considerably declined, so that in May, 1942, it was no more than about 135 tons. There are also the deposits at Libros in Teruel, worked by La Industria Química de Zaragoza with a monthly yield of about 100 tons. Many other deposits are practically or entirely unworked. The total yield of native sulphur is estimated at 6000 tons per annum (first melt).

Production of Pyritic Sulphur

The recovery of sulphur from pyrites smelter fumes is now a well-known process in Spanish copper metallurgy, and at Rio Tinto the output has reached some 26,000 tons per annum. The hot gases carrying the sulphur in vapour form pass first into a steel dust collector and thence into a Cottrell precipitator lined with refractory material. They pass next into two Kestner tubular evaporators for cooling, the heat being used at the same time to boil water, and the vapours subjected to a pressure of over five atmospheres. The gases are cooled to a temperature below the condensation point of sulphur vapour (444° C.) which is thus condensed into fine droplets; and as mist, together with the gases, is conveyed to another set of Cottrell precipitators, from which it flows in the form of melted sulphur while the purified gases escape to atmosphere. The sulphur melt is freed from arsenic by leaching with lime and filtering.

Refined sulphur in its various forms—flowers, lump or roll, and precipitated—is manufactured in Spain by the following firms, in order of importance: Unión Azufrera S.A., of Tarragona; Juan Pallarés y Hermano, of Tarragona; and the Compañia Azufrera del Noroeste de España, of Vigo. These all purchase the crude sulphur from Rio Tinto. The Spanish sulphur industry is governed by a decree, dated July 10, 1939, of the Director-General of Mines and Fuels, which stipulates among other things that the following shall be sulphur producers in Spain: Productos Químicos de Huelva, of Rio Tinto; Coto Minero de Hellín; Romero Hermanos; and La Industrial Química de Zaragoza; while the refiners are the three firms named earlier in this paragraph. Production of these three latter in 1942 was (in metric tons) 5437.4, 4013.8, and 2372.0 respectively; and that of the Coto Minero 3689.4, Industria Química 3956.5, and Romero 3518.6, making a grand total of 23,093.7 metric tons.

Total Consumption

Total consumption in 1942 was about 32,000 tons, of which some 11,300 were used in industry (including 6000 tons for carbon disulphide) and 21,000 tons for agricultural purposes, excluding insecticides which are lumped with the industrial uses. Consumption has increased during the last year or

two and would have been still greater had there been sufficient supplies. The two chief reasons for this are: greater appreciation and use in agriculture, and new industries in Spain (by which presumably is meant mainly synthetic textiles). Artificial silk in particular requires large amounts of carbon disulphide, and the growth of such companies as the F.E.F.A. and S.N.I.A.C.E. will further augment this demand. It will have to be met by renewed imports unless home production is increased.

As to the possibility of increasing this home production the author thinks that further production from the copper smelting is limited at present by lack of suitable coke. It would probably be somewhat easier to augment production of native sulphur; while a third course is the recovery of sulphur from furnace or factory gases which at present escape into the atmosphere, wasting the sulphur content and damaging vegetation. After a brief discussion of the various possibilities it is concluded that an extension of the smelting plants of Rio Tinto offers the best prospect, as the national output of both sulphur and copper would be increased.

Wood Distillation

In an earlier issue of *Ion*, Señor J. Gil Montero had discussed in general terms the possibility of establishing in Spain a wood distillation industry; and more recently (September, 1943) he deals with the subject in some detail. He points out that two-thirds of the total mountain area of Spain is covered with pines, at medium and low altitudes; and the area could be considerably extended by suitable afforestation. This would not only very largely increase the supply of material for wood distillation, but bring with it many other important benefits, notably in the matter of rainfall, soil conservation, and a more equable climate in those parts of the country now subject to extremes. The river system, too, would be improved and less subject to drought and flood. In France, where the forest area is not more than one-fifth of the total, products to the value of several million francs annually are obtained from the forests by distillation and other processes; whereas Spain, with double that forest area, has hitherto imported the greater part of her needs. By proper utilisation of her great present and potential wealth of forest products the position should be reversed: she should be able to supply all her own needs and have a large surplus for export.

The most important species of pine in Spain, according to Montero, are *Pinus pinea* which abounds in Andalusia and Old and New Castile; *Pinus silvestris*, in the north and east of Spain, distinguished for its excellent timber; the black pine, *P. montana*, which also yields good timber and grows abundantly in the Pyrences; the Corsican pine, *P. laricio*, which is found plentifully in the sierras of Cazorla, Segura, and Cuenca, famous for its high quality timber; the Aleppo pine, *P. halepensis* which, together with *P. pallasiana* or *maritima*, is valued in Southern Europe chiefly for its resinous products. There is also the famous *P. pinaster* which flourishes on sandy soils around the Mediterranean from Spain to the Levant, as well as on the dunes of the Gironde in France, where it has long been noted as a source of rosin and turpentine. The author considers this the most important of all the pine group from the point of view of establishing the proposed forest products industry in Spain. He also refers to the "Sabine pine" which is presumably the *P. sabiniana* (nut pine of California) and many other conifers, including the cedars of Spanish Morocco.

Re-afforestation

The advantages of a progressive policy of re-afforestation have by no means been overlooked in Spain in recent years. Some schemes are already in hand or projected, especially in connection with pines and conifers. The Instituto Forestal de Investigaciones (Forest Research Station) has recommended re-afforestation of the Cantabrian mountains with pines of different varieties, such as *pinaster*, together with the eucalyptus and the American oak; for the Catalan region of the Pyrenees *P. sylvestris*, *laricio*, *montana*, together with some firs and birch; and for Levante (Valencia), *P. halepensis* In this connection the interesting and rather curiously expressed calculation has been made that "in the northern provinces re-afforestation will, in some twenty years, increase by ten times the heat of the soil."

In Granada an afforestation scheme for planting 30,000,000 pines has already begun; and in the province of Jaen, which contains about a third of the mountainous region included in the Patrimonio Forestal del Estado (State Forest Domain), a replanting programme has been started at the rate of 3500 hectares per annum. Seven million young pines are already growing in the nurseries and plantations, ready for immediate planting out. In the neighbourhood of Madrid also are plantations of several varieties of pine, cedars, etc. Schemes are in hand, too, for Andalusia, Estremadura, Aragon, and Castile.

The author thinks, however, that it is in the better utilisation of existing woods and forests that most rapid progress can be made. There are still vast tracts of forest in many parts of Spain which are at present remote from railways or other means of transport, including at least a third part of the mountain uplands. Even by working

only a comparatively small area of her resources Spain produces annually some 3,000,000 kg. of turpentine and 10,500,000 kg. of colophony, so that she occupies third place among the world producers of these products. Montero thinks she could easily reach first place if the more readily accessible forests and plantations were fully utilised, to say nothing of the larger area which are still remote from means of communication.

High-Grade Rosin

He claims that the Spanish industry has succeeded in obtaining a 70 per cent. rosin of "Excelsior" quality (which, in seven grades, is superior to the better grades of the U.S.A.) and numbers among its pine product factories the first in the world to adopt vacuum distillation, namely that of La Avellaneda company in Anquela del Ducado (Guadalajara), whose products compete easily, in Montero's opinion, with those of France, Mexico, and North America. But at present these valuable raw materials are returned to Spain at a very greatly increased cost in the form of manufactured goods, such as paints, varnishes, lacquers, dyes, perfumes, and many others, all of which are of comparatively simple manufacture and could easily be produced in Spain. In fact many of them are already made in Spain, including synthetic camphor sufficient for the national need; and it is probable that the same may soon be said in regard to celluloid, thus providing a much more remunerative use for the native pine products. If the output of these latter was considerably increased, as it might well be, there would be an end to this irrational and uneconomic export of raw material; and at the same time there would be a good margin for export after legitimate home needs had been fully satisfied.

These, however, are only a few of the great possibilities of a more scientific utilisation of Spain's very considerable forest products. The author refers to the recent appointment in Berlin of a commission representing German, Swedish, and Finnish interests, to study the problems, physical and chemical, of forest products utilisation; and he thinks that for Spain there are few economic and industrial developments of greater importance and urgency than that of a completely rational use of her present and potential forest wealth.

Starch Products

At a recent technical meeting of the S.A. Cuatrecasas reference was made to the heavy imports of starch and dextrin, especially into Cataluña and Levante, for use in the textile and other industries. Hitherto it has not been possible to grow either potatoes or maize in Spain at a sufficiently low cost to establish on any substantial scale the manufacture of starch and allied products or derivatives, particularly in view of the low rates at which these could be imported from the Netherlands and elsewhere.

It has been recently suggested that a suitable raw material could be imported in the form of manioc or yucca root. (In the Spanish original the latter is called *Yuca* and is said to be an alternative name for manioc). This nomenclature is not quite clear: manioc is the root of the cassava plant from which the tapioca of commerce is prepared, while the ordinary yucca is quite a distinct species of the order *Liliaceæ*. "Yuca" is the old Spanish word for bayonet, aptly used to represent the sharp-pointed sword-shaped leaves of the plant or shrub. It has been found possible to import into Spain the first few tons of manioc root at a low price, although there appears to have been some initial difficulty in getting a sufficiently pure raw material.

Manioc for Glucose

Several leading Spanish firms are said to have been interested in experimental work on this comparatively new material, including its use in the manufacture of glucose. It is pointed out, as regards this latter, that the question of extreme purity did not matter so much, as trouble due to impurities could be fairly easily overcome during the cycle of operations; but this hardly applied in the case of the manioc or starch used for dextrin or textile manufactures. In the latter certain difficulties and prejudices had to be overcome, especially as the potato starch which was available to a limited extent was of 98.5 per cent. purity. Nevertheless, the use of manioc starch is gradually extending, and imports from the Spanish possessions in West Africa, where it is being increasingly cultivated, are more and more in demand. It is anticipated, too, that the cultivation of rice in Spain and in her tropical oversea territories will be very greatly extended, both as food crop and a valuable source of starch and derived products.

Geological surveys in Newfoundland in 1943 were handicapped by lack of qualified technical staff. A copper-molybdenite deposit was explored, while a number of samples of celestite-barytes ore were sent to the United States in an effort to determine the method of separating the strontium from the barium minerals. A fair tonnage of this ore is indicated in Newfoundland, but suitable means of working it will have to be developed. In the Lewis Brook area some high-grade cross-fibre asbestos was located. In the Labrador area surveys were made of iron ore and nickel.

British Chemical Patents in Germany

A Survey of the War-Time Position

by S. T. MADELEY

GERMANY holds so important a place in the chemical world that her war-time handling of British-owned patents is of great interest to patentees. Broadly, the legislative action taken by the German Government to meet the present emergency follows much on the lines of our own. Its general effect is to place British inventions and trade marks for which applications have been filed in Germany at the temporary disposal of interested parties in that country who are desirous and capable of exploiting them for the benefit of Germany. The provisions of the Orders dealing with the subject do not appear to involve confiscation of patent and trade-mark rights on the one hand. On the other, the fees payable to the German Patent Office for right of exercise and use of such inventions are moderate.

Typical German Patent

Here is a German patent, granted in the middle of 1943 (No. 735,321; to Pfannmüller and others). Method of production of hydrazine by treating urea in aqueous alkaline solution with alkali hypochlorite solution, characterised by the fact that the solutions are mixed at low temperatures which do not substantially exceed water temperature and the mixture is heated so far as possible without delay.

Those acquainted with the formal nature of German patent claims will at once recognise the above claim as having undergone the ordeal of an examination as to novelty. Indications of this nature and others obtainable from the pretty considerable range of Patent Office Journals (*Patentblatt*) which have found their way to our Patent Office since the war began lead one to suppose that the German Patent Office still functions efficiently. It may be remarked, however, that during the same period German patent specifications are conspicuous by their absence. There is evidence to show that at any rate some of the German branches of British concerns have been operating since the commencement of hostilities. They have been paying their taxes!

Let us now review the situation in which a British owner of German patents ("ordinary" and "useful model") or trade marks finds himself as regards those particular forms of his assets. First, it will be necessary to consider the general Order which came into force on August 26, 1939, relating to Patents, *Gebrauchsmuster* (useful model patents) and Trade Marks. This Order contained eleven sections of which the essence is as follows:

The Original Order

(1) An automatic extension of time is allowed for payment of Patent Office taxes. If the delivery of the relevant notice takes place after the Order comes into force the extension is three months, one month if before. Three months after the delivery of a decision to publish an application, that application may be published even if the publication fee has not been paid.

(2) Three months extension of time was allowed in proceedings which were pending before the Office when the Order came into force. Further regulations relating to such extensions may be made by the President of the Patent Office.

(3) The applicant or legal owner of a patent may request a further extension of time for payment of the taxes and fees mentioned under Section 1 if he is prevented by extraordinary circumstances from paying them and if he asks for the further extension before the original one had expired. Yet another extension is obtainable if applied for before expiration of the current period.

(4) In cases where anyone's right would be disadvantageously affected by his having neglected to observe a time allowed for patent office procedure and where that neglect was due to extraordinary circumstances, he may apply to be restored to his original position. However, this does not affect times allowed for filing oppositions, for appealing against decisions to grant patents, for applying for revocation of patents, or for filing priority applications. The Minister of Justice is to decide on the time limit for an application for restoration.

(5) International Convention priority periods which were pending when the Order came into force were not to end until the termination of six months thereafter.

(6) Delay of the publication of a patent application beyond the legal maximum period may take place.

(7) Sections 3 to 6 are only applicable to the nationals of foreign States which take similar measures in respect of German citizens.

(8) If after a hearing by the relevant Government department the Patent Office decides that an invention must be kept secret for reasons of national defence, then

a patent may be granted or a *Gebrauchsmuster* registered with publication. Necessary regulations for carrying out this section may be issued by the Minister of Justice.

Sections 9 and 10 are concerned with departmental procedure, and Section 11 determines the date of coming into force of the Order and empowers the Minister of Justice to determine when it shall cease to have effect.

British Subjects Affected

An Order of February 26, 1940, which relates specifically to British citizens is based on an Order of January 15, 1940, and in particular in Section 26 thereof, which is to the effect that the Minister of Justice may take reprisal measures against enemy assets. This is the case where an enemy State deals with industrial property rights, over which it has jurisdiction, owned by German subjects, in a different manner from that in which it deals with similar rights of its own nationals. This also is the situation where the acquisition of industrial property rights is concerned.

According to this Order: (1) Interested parties may apply for the right of use of German patent and *Gebrauchsmuster* rights owned by British subjects, even if a third party already has the right to exclusive use thereof. Such an application may be made by someone who already on another ground has the legal right of use.

(2) The use of a British-owned German trade-mark may be applied for by an interested party should such use appear necessary to define an article corresponding, as to nature or use, to the article in respect of which the trade-mark has hitherto been placed on the market.

(3) Where British subjects have applied for grant of patent or registration of trade-mark, such grant may be suspended.

(4) When there are other applicants or owners besides British subjects Sections 1 to 3 can be employed.

(5) Where assignment has been made of the relevant rights of British subjects with the inferred object of avoiding the effect of Sections 1 to 3, those sections can be employed. This is especially the case where the Patent Office was first informed of the assignment later than August 31, 1939.

(6) The definition "British subjects" includes subjects of British Possessions Overseas, Colonies, Protectorates, and Mandated Territories.

(7) The President of the Patent Office makes orders under Sections 1 to 3. He also will decide on the payment and various conditions imposed relating to the grant of the right of use and exercise. These orders of his can be retrospective, and can be altered and withdrawn.

(8) Support is to be afforded to the statements on which the application is based. Moderate fees (RM 50) are payable to the Patent Office with the application.

(9) Owners of the rights to which the application applies are to be given an opportunity so far as possible of making their views known, for which privilege a moderate fee (RM 50) is payable, or the owner's statement will be ignored.

Witnesses and Experts

(10) The attendance of witnesses and experts and further information may be demanded by the President of the Patent Office to elucidate the matter. Fees are payable to the experts and witnesses for their services. If the applicant does not act in accordance with official request he must pay the cost of the witnesses and experts.

(12) The amount of the payments payable to the State under the Orders of the President of the Patent Office are to be determined by that official.

(13) The Minister of Justice is to determine when the Order ceases to be in force.

The way certainly seems to be left open for a reasonable and fair post-war adjustment of patent rights and so on. It is to be hoped that the opportunity will not be lost. Progress is bound up with invention.

The U.S. and Netherlands Governments have accepted an invitation to send officials to London towards the end of July to engage in exploratory talks on the problems of crude and synthetic rubber production after the war, says a Foreign Office announcement. The British delegation will be led by Mr. O. S. Franks, of the Ministry of Supply.

Hungarian sources report that a new factory has been opened by the Government for the manufacture of cellulose from maize-straw and the stalks of sunflowers. New "secret" methods will be used on which, it is understood, Government laboratories have been experimenting for months, and a new system has been established to bring production into line with war-time requirements.

An exhibition of dust removal from the internal heating surfaces of Lancashire boilers was given at Hogganfield, Millerton, Glasgow, recently. A soot blower, in the form of a steam jet or compressed air, is operated from the front of the boiler. A small door below each bridge, an air or steam valve, a short length of steam or air hose and steam piping complete the equipment. Effective cleaning of boilers while in operation and as frequently as required has been achieved by this method, with notable economies in combustion and fuel.

Personal Notes

MR. R. H. HENRIKSEN, A.R.I.C., M.P.S., has been elected president for 1944-45 of the Guild of Public Pharmacists.

MR. A. G. HOLBOROW, F.R.I.C., has retired from the position of City Analyst and Bacteriologist, Gibraltar, which he has held since 1921.

MR H. ST. J. SOMERSET has been elected president of the Australian Mines and Metals Association in succession to the late Sir Colin Fraser.

MR HARRY HEY, president of the Australasian Institute of Mining and Metallurgy, and technical superintendent of the Electrolytic Zinc Co. of Australasia, Ltd. has been appointed to the vacancy on the board of that company caused by the death of Sir Colin Fraser.

MR. JOHN BRYAN WILLIS, B.Sc., medallist in chemistry at the University of Sydney, has been awarded the Masson Memorial Scholarship for 1944 by the Australian Chemical Institute. He proposes to carry out research in physical chemistry in the chemistry department of his university.

MR. I. H. BOAS, chief of the forest products laboratory of the Australian Council for Scientific and Industrial Research, who played an important part in the development of a process for the manufacture of paper from Australian hardwoods, retired at the end of April, and was succeeded by Mr. S. A. CLARKE, deputy-chief of the division.

Obituary

MR. HARROLD HARRIS, M.Sc., who was senior lecturer in metallurgy at Birmingham University from after the last war until his retirement in 1936, died at Streetly, near Birmingham, on July 15, aged 75.

PROFESSOR JAMES NETHERWOOD SUGDEN, A.R.C.S., B.Sc., Ph.D. (Lond.), senior lecturer in inorganic chemistry at the Imperial College of Science and Technology, has died this month as a result of enemy action. The funeral was at Kensington Cemetery on July 17.

PROFESSOR GEORG BREDIG died in New York on April 23, where he had been since 1940 on the invitation of Princeton University. Formerly Professor of Physical Chemistry and Electrochemistry at the Institute of Technology, Karlsruhe, he was compelled to resign his post in 1933, and left Germany in 1939. His discovery of the method of producing colloidal metal solutions by electric dispersion, and his paper on asymmetric catalysis were of basic importance in their several scientific fields.

LIEUT. J. C. COLBECK-WELCH, who is reported killed in action at the age of 23, was the son of the late Major G. S. M. Colbeck-Welch, M.C., a director of Hickson & Welch, Ltd., Castleford, whose untimely death was reported in our columns in March last year.

We regret to announce the accidental death on July 4, at the age of 29, of MR. HENRY W. J. HATHAWAY, B.Sc., A.R.C.S., who was works chemist at the Fullers' Earth Union, Ltd., before joining Bound Brook Bearings (G.B.), Ltd., of Birmingham. He will be remembered for his great manual dexterity and experimental skill in chemical engineering and laboratory technique. He leaves a young widow.

New Control Orders

Labelling of Food

THE Minister of Food has made an Order, entitled the Labelling of Food Order, 1944, which implements the policy set out in the White Paper on the Labelling and Advertising of Food. The Order details the general requirements which must be met by labels on all prepacked food, and also the special rules which apply to both labels and advertisements claiming the presence of vitamins or minerals in any food. Among certain foods which are exempted from the requirements are self-raising flour, suet, baking-powder, etc., for which special regulations were recently enacted. The Order does not come into force until January 1, 1945.

Work in connection with the reopening of the government-owned explosives plant at Nobel, Ontario, is already under way, according to officials of Canadian Defence Industries, Ltd. The potential production is not yet known, but it is expected that about 2000 workers may be required.

A modification of the U.S. Synthetic Rubber Programme was ordered recently by Mr. Bradley Dewey, the Rubber Director, to permit emergency output of 1,000,000 barrels of aviation petrol. Mr. Dewey said that 400,000 barrels of petroleum ingredients for synthetic rubber would be diverted to the production of high-octane fuel.

Canada has produced about a half-million tons of ammonium nitrate, used for fertilisers and explosives, from the beginning of the war to March 31 this year, the Canadian Chemical Conference was told in Toronto by Mr. L. R. Macrae, chemicals and explosives division of the Allied War Supplies Corporation. "In the coming year," said Mr. Macrae, "total Canadian ammonium nitrate production may approach 250,000 tons.

Prices of British Chemical Products

FAIRLY steady trading conditions have been reported on the London chemical market during the past week, more especially with regard to the flow of contract specifications. Fresh inquiry has been more in evidence and a certain amount of new business has been reported. In the soda section, sulphides are on a very firm basis and there is a steady movement of supplies against contracts. Yellow prussiate of soda is in short supply and prices are strong, while contract deliveries of solid and liquid caustic soda have been maintained at a reasonably good level. A steady movement of both the photographic and technical grades of hyposulphite of soda is reported and a moderate inquiry has been made for bicarbonate of soda and soda ash. Among the potash chemicals, makers of permanganate of potash are finding a ready outlet for small supplies, and the comparatively limited offers of bichromate of potash and solid caustic potash are also being steadily absorbed by priority users, with values unchanged. A fairly steady trade is being done in acid phosphate of potash. New business locally in coal-tar products has not been excessive during the past week, and contract deliveries have also been affected to some extent by seasonal conditions. Trade in pitch has been on a moderate scale, while a fair movement of both crude and refined tar has been reported. Quotations for the pyridines have been maintained without much change, and the light distillates are in good request.

MANCHESTER.—In spite of holiday conditions in some local areas there is a fairly steady demand for the general run of industrial chemicals on the Manchester market, including sulphuric and hydrochloric acids, the alkalis, alum, and the magnesia and soda products. Barium carbonate and blanc fixe, which are being absorbed in fair quantities, have moved up this week to the extent of 20s. per ton. Most other materials remain on a very firm basis. The light and heavy by-products generally are meeting with a steady demand, especially creosote oil and the benzols and toluols.

Price Changes

Rises: Barium carbonate; barium sulphate; formaldehyde; glycerine; linseed oil; magnesium chloride.

General Chemicals

Acetic Acid.—Maximum prices per ton: 80% technical, 1 ton £39 10s.; 10 cwt./1 ton, £40 10s., 4/10 cwt., £41 10s.; 80% pure, 1 ton, £41 10s.; 10 cwt./1 ton, £42 10s.; 4/10 cwt., £43 10s.; commercial glacial, 1 ton, £49; 10 cwt./1 ton, £50; 4/10 cwt., £51; delivered buyers' premises in returnable barrels, £4 10s. per ton extra if packed and delivered in glass.

Acetone.—Maximum prices per ton, 50 tons and over, £65; 10/50 tons, £65 10s.; 5/10 tons, £66; 1/5 tons, £66 10s.; single drums, £67 10s.; delivered buyers' premises in returnable drums or other containers having a capacity of not less than 45 gallons each. For delivery in non-returnable containers of 40/50 gallons, the maximum prices are £3 per ton higher. Deliveries of less than 10 gallons free from price control.

Alum.—Loose lump, £16 per ton, f.o.r.

Aluminium Sulphate.—Ex works, £11 5s. per ton d/d.

Ammonia, Anhydrous.—1s. 9d. to 2s. 3d. per lb.

Ammonium Carbonate.—£37 10s. to £38 per ton d/d in 5 cwt. casks.

Ammonium Chloride.—Grey galvanising, £22 10s. per ton, in casks, ex wharf. Fine white 98%, £19 10s. per ton. See also Salammoniac.

Antimony Oxide.—£111 to £117 per ton.

Arsenic.—99/100%, under 1 ton, £62; 1 ton, £61; white 98/99%, £59; grey 96/97%, £54; grey 95/96%, £52; crude, £35 per ton.

Barium Carbonate.—Precip., 4-ton lots, £18 per ton d/d; 2-ton lots, £18 5s. per ton.

Barium Chloride.—98/100%, prime white crystals, £17 10s. to £19 10s. per ton, bag packing, ex works.

Barium Sulphate (Dry Blanc Fixe).—Precip., 4-ton lots, £18 15s. per ton d/d; 2-ton lots, £19 10s. per ton.

Bleaching Powder.—Spot, 35/37%, £11 to £11 10s. per ton in casks, special terms for contract.

Borax.—Per ton for ton lots, in free 1-cwt. bags, carriage paid: Commercial, granulated, £34; crystals, £35; powdered, £35 10s.; extra fine powder, £36 10s.; B.P., crystals, £43; powdered, £43 10s.; extra fine, £44 10s. Borax glass, per ton in free 1-cwt. waterproof paper-lined bags, for home trade only, carriage paid: lump, £84 10s.; powdered, £85 10s.

Boric Acid.—Per ton for ton lots in free 1-cwt. bags, carriage paid: Commercial, granulated, £62; crystals, £63; powdered, £64; extra fine powder, £66. B.P., crystals, £71; powder, £72; extra fine, £74.

Calcium Bisulphide.—£6 10s. to £7 10s. per ton f.o.r. London.

Calcium Chloride.—70/72% solid, £5 15s. per ton, ex store.

Charcoal, Lump.—£15 to £16 per ton, ex wharf. Granulated, supplies scarce.

Chlorine, Liquid.—£23 per ton, d/d in 16/17 cwt. drums (3-drum lots).

Chrometan.—Crystals, 5½d. per lb.

Chromic Acid.—1s. 5d. per lb., less 2½%, d/d U.K.

Citric Acid.—Controlled prices per lb., d/d buyers' premises. For 5 cwt. or over, anhydrous, 1s. 6¾d., other, 1s. 5d.; 1 to 5 cwt., anhydrous, 1s. 9d., other, 1s. 7d. Higher prices for smaller quantities.

Copper Oxide.—Black, powdered, about £100 per ton.

Copper Sulphate.—£31 5s. per ton, f.o.b., less 2%, in 2 cwt. bags.

Cream of Tartar.—100 per cent., per cwt., for 10 cwt., or more, £14 11s. 6d.; 5 to 10 cwt., £14 12s. 6d.; 2 to 5 cwt., £14 13s. 6d.; 1 to 2 cwt., £14 14s. 6d., d/d in sellers' returnable casks. Less than 1 cwt., 2s. 8d. to 2s. 10d. per lb. d/d. Maximum controlled prices.

Formaldehyde.—£25 to £27 15s. per ton in casks, according to quantity, d/d.

Formic Acid.—85%, £47 per ton for ton lots, carriage paid; smaller parcels quoted up to 50s. per cwt., ex store.

Glycerine.—Chemically pure, double distilled 1260 s.g., in tins, £4 to £5 per cwt., according to quantity; in drums, £3 19s. 6d. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hexamine.—Technical grade for commercial purposes, about 1s. 4d. per lb.; free-running crystals are quoted at 2s. 1d. to 2s. 3d. per lb.; carriage paid for bulk lots.

Hydrochloric Acid.—Spot, 7s. 6d. to 8s. 11d. per carboy d/d, according to purity, strength and locality.

Hydrofluoric Acid.—59/60%, about 1s. to 1s. 2d. per lb.

Iodine.—Resublimed B.P., 10s. 4d. to 14s. 6d. per lb., according to quantity.

Lactic Acid.—Pale tech., £47 per ton; dark tech., £40 per ton ex works; barrels returnable.

Lead Acetate.—White, 50s. 6d. to 52s. 6d. per cwt. MANCHESTER: £51 to £54 per ton.

Lead Nitrate.—About £47 per ton d/d in casks.

Lead, Red.—English, 5/10 cwt., £45 per ton; 10 cwt. to 1 ton, £44 15s.; 1/2 tons, £44 10s.; 2/5 tons, £44; 5/20 tons, £43 10s.; 20/100 tons, £43; over 100 tons, £42 10s. per ton, less 2½%, carriage paid. Non-setting red lead, 10s. per ton dearer in each case.

Lead, White.—Dry English, less than 5 tons, £57; 5/15 tons, £53; 15/25 tons, £52 10s.; 25/50 tons, £52; 50/200 tons, £51 10s. per ton, less 5% carriage paid. Ground in oil, English, 5/9 cwt., £69; 10 cwt., £68 10s.; 1/2 tons, £67 10s.; 2/5 tons, £66; 5/10 tons, £64; 10/15 tons, £63; 15/25 tons, £62 10s.; 50/100 tons, £61 10s. per ton, less 5% carriage paid.

Litharge.—1 to 2 tons, £44 10s. per ton.

Lithium Carbonate.—7s. 9d. per lb. net.

Magnesite.—Calcined, in bags, ex works, £18 15s. to £22 15s. per ton.

Magnesium Chloride—Solid (ex wharf), £22 per ton.

Magnesium Sulphate.—Nominal.

Mercury Products.—Controlled price for 1-cwt. quantities: Bichloride powder, 15s. 8d.; bichloride lump, 16s. 3d.; mercury oxide, red cryst., 20s. 9d.; red levig., 20s. 3d.; red tech., 19s. 11d.; yellow levig., 20s. 2d.; yellow tech., 19s. 7d.; sulphide, red, 17s. 9d.

Methylated Spirit.—Industrial 66° O.P. 100 gals., 2s. 4d. per gal.; pyridinised 64° O.P. 100 gals., 2s. 5d. per gal.

Nitric Acid.—£24 to £26 per ton, ex works.

Oxalic Acid.—£60 to £65 per ton for ton lots, carriage paid, in 5-cwt. casks; smaller parcels would be dearer; deliveries slow.

Paraffin Wax.—Nominal.

Potash, Caustic.—Solid, £65 10s. per ton for 1-ton lots; flake, £73 per ton for 1-ton lots. Liquid, d/d, nominal.

Potassium Bichromate.—Crystals and granular, 7¾d. per lb.; ground, 8¼d. per lb., for not less than 6 cwt.; 1-cwt. lots, ½d. per lb. extra.

Potassium Carbonate.—Calcined, 98/100%, £67 5s. per ton ex store; hydrated, £61 10s. per ton.

Potassium Chlorate.—Imported powder and crystals, nominal.

Potassium Iodide.—B.P., 8s. 8d. to 12s. per lb., according to quantity.

Potassium Nitrate.—Small granular crystals, 76s. per cwt. ex store, according to quantity.

Potassium Permanganate.—B.P., 1s. 10d. per lb. for 1 cwt. lots; for 3 cwt. and upwards, 1s. 9½d. per lb.; technical, £7 18s. 6d. to £8 10s. 6d. per cwt., according to quantity d/d.

Potassium Prussiate.—Yellow, nominal.

Salammoniac.—First lump, spot, £48 per ton; dog-tooth crystals, £50 per ton; medium, £48 10s. per ton; fine white crystals, £19 10s. per ton, in casks, ex store.

Soda, Caustic. — Solid 76/77%; spot, £16 7s. 6d. per ton d/d station.

Sodium Acetate.—£41 per ton, ex wharf.

Sodium Bicarbonate.—Refined, spot, £11 per ton, in bags.

Sodium Bichromate.—Crystals, cake and powder, 6½d. per lb.; anhydrous, 6¼d. per lb., net, d/d U.K.

Sodium Bisulphite. — Powder, 60/62%, £19 10s. per ton d/d in 2-ton lots for home trade.

Sodium Carbonate Monohydrate.—£21 per ton d/d in minimum ton lots in 2 cwt. free bags.

Sodium Chlorate.—£36 to £42 per ton, nominal.

Sodium Hyposulphite.—Pea crystals, £21 10s. per ton for 2-ton lots; commercial, £15 per ton.

Sodium Iodide.—B.P., for not less than 28 lb., 9s. 11d. per lb., for not less than 7 lb., 13s. 1d. per lb.

Sodium Metasilicate.—£16 10s. per ton, d/d U.K. in ton lots.

Sodium Nitrite.—£20 to £23 10s. per ton for ton lots.

Sodium Percarbonate.—21½% available oxygen, £7 per cwt.

Sodium Phosphate.—Di-sodium, £26 10s. per ton d/d for ton lots. Tri-sodium, £27 10s. per ton d/d for ton lots.

Sodium Prussiate.—9d. to 9½d. per lb. ex store.

Sodium Silicate.—£6 to £11 per ton.

Sodium Sulphate (Glauber Salt).—£4 10s. per ton d/d.

Sodium Sulphate (Salt Cake).—Unground. Spot £4 11s. per ton d/d station in bulk. MANCHESTER: £4 15s. per ton d/d station.

Sodium Sulphide. — Solid, 60/62%, spot, £18 5s. per ton, d/d, in drums; crystals, 30/32%, £12 7s. 6d. per ton, d/d, in casks.

Sodium Sulphite.—Anhydrous, £29 10s. per ton; pea crystals, £20 10s. per ton d/d station in kegs; commercial, £12 to £14 per ton d/d station in bags.

Sulphur.—Per ton, ground, £16.

Sulphuric Acid.—168° Tw., £6 10s. to £7 10s. per ton; 140° Tw., arsenic-free, £4 11s. per ton; 140° Tw., arsenious, £4 3s. 6d. per ton. Quotations naked at sellers' works.

Tartaric Acid.—Per cwt., for 10 cwt. or more, £19 12s.; 5 to 10 cwt., £19 13s. 6d.; 2 to 5 cwt., £19 15s.; 1 to 2 cwt., £19 17s. Less than 1 cwt., 3s. 7d. to 3s. 9d. per lb. d/d, according to quantity. Maximum controlled prices.

Tin Oxide.—Nominal.

Zinc Oxide.—Maximum prices per ton for 2-ton lots, d/d; white seal, £34; green seal, £33; red seal, £31 10s.

Zinc Sulphate.—Tech., £20-£21 per ton, carriage paid, casks free.

Rubber Chemicals

Antimony Sulphide.—Golden, 1s. 2d. to 2s. 1½d. per lb. Crimson, 2s. 2d. to 2s. 6d. per lb.

Arsenic Sulphide.—Yellow, 1s. 9d. per lb.

Barytes.—Best white bleached, £8 3s. 6d. per ton.

Cadmium Sulphide.—6s. to 6s. 6d. per lb.

Carbon Bisulphide.—£34 to £39 per ton, according to quality, in free returnable drums.

Carbon Black.—6d. to 8d. per lb., according to packing.

Carbon Tetrachloride.—£44 to £49 per ton, according to quantity.

Chromium Oxide.—Green, 2s ped lb.

India-rubber Substitutes.—White, 6 3/16d. to 10¼d. per lb.; dark, 6 3/16d. to 6 15/16d. per lb.

Lithopone.—30%, £25 per ton; 60%, £31 to £32 per ton. Imported material would be dearer.

Mineral Black.—£7 10s. to £10 per ton.

Mineral Rubber, "Rupron."—£20 per ton.

Sulphur Chloride.—7d. per lb.

Vegetable Lamp Black.—£49 per ton.

Vermilion.—Pale or deep, 15s. 6d. per lb. for 7-lb. lots.
Plus 5% War Charge.

Nitrogen Fertilisers

Ammonium Phosphate.—Imported material, 11% nitrogen, 48% phosphoric acid, per ton d/d farmer's nearest station, £20 15s.

Ammonium Sulphate.—Per ton in 6-ton lots, d/d farmer's nearest station, £10 2s.

Calcium Cyanamide.—Nominal; supplies very scanty.

Concentrated Fertilisers.—Per ton d/d farmer's nearest station: I.C.I. type "Special No. 1," £14 18s. 6d. Type "Special No. 2," £16.

"Nitro Chalk."—£9 14s. per ton in 6-ton lots, d/d farmer's nearest station.

Sodium Nitrate.—Chilean super-refined for 6-ton lots d/d nearest station, £15 5s. per ton; granulated, over 98%, £14 10s. per ton.

Coal Tar Products

Benzol.—Crude, 60's, 1s. 11d.; pure, 2s. 6d., per gal., ex works.

Carbolic Acid.—Crystals, 11½d. per lb. Crude, 60's, 4s. 3d. to 4s. 6d., according to specification. MANCHESTER: Crystals, 9¾d. to 11½d. per lb., d/d; crude, 4s. to 4s. 6d., naked, at works.

Creosote.—Home trade, 6½d. to 7d. per gal., f.o.r. maker's works. MANCHESTER, 6¼d. to 9¾d. per gal.

Cresylic Acid.—Pale, 97%, 3s. 6d. per gal.; 99%, 4s. 2d.; 99.5/100%, 4s. 4d. American, duty free, 4s. 2d., naked at works. MANCHESTER: Pale, 99/100%, 4s. 6d. per gal.

Naphtha.—Solvent, 90/160°, 2s. 8d. per gal. for 1000-gal. lots; heavy, 90/190°, 2s. 2d. per gal. for 1000-gal. lots, d/d. Drums extra; higher prices for smaller lots. Controlled prices.

Naphthalene.—Crude, ton lots, in sellers' bags, £6 6s. 8d. to £9 7s. 7d. per ton, according to m.p.; hot-pressed, £11 5s. per ton, in bulk ex works: purified crystals, £19 to £35 per ton. Controlled prices.

Pitch.—Medium, soft, 50s. to 55s. per ton, f.o.b. MANCHESTER: 60s. to 62s. per ton f.o.b.

Pyridine.—90/140°, 17s. to 17s. 6d. per gal.; 90/160°, 13s.—MANCHESTER, 13s. 6d. to 18s. per gal.

Toluol.—Pure, 2s. 7d. per gal.; 90's, 1s. 11d. per gal. MANCHESTER: Pure, 2s. 7½d. per gal. naked.

Xylol.—For 1000-gal. lots, 3s. 1½d. to 3s. 4d. per gal., according to grade, d/d. Drums extra; higher prices for smaller lots. Controlled prices.

Wood Distillation Products

Calcium Acetate.—Brown, £21 per ton; grey, £24. MANCHESTER: Grey, £24 to £25 per ton.

Methyl Acetone.—40/50%, £56 per ton.

Wood Creosote.—Unrefined, about 2s. per gal., according to boiling range.

Wood Naphtha, Miscible.—4s. 6d. to 5s. 6d. per gal.; solvent, 5s. 6d. per gal.

Wood Tar.—£5 per ton.

Intermediates and Dyes (Prices Nominal)

m-**Cresol** 98/100%.—Nominal.

o-**Cresol** 30/31° C.—Nominal.

p-**Cresol** 34/35° C.—Nominal.

Dichloraniline.—2s. 8½d. per lb.

Dinitrobenzene.—8½d. per lb.

Dinitrotoluene.—48/50° C., 9½d. per lb; 66/68° C., 1s.

p-**Nitraniline.**—2s. 5d. per lb.

Nitrobenzene.—Spot, 5½d. per lb. in 90-gal drums, drums extra, 1-ton lots d/d buyer's works.

Nitronaphthalene.—1s. 2d. per lb.; P.G., 1s. 0½d. per lb.

o-**Toluidine.**—1s. per lb., in 8/10 cwt. drums, drums extra.

p-**Toluidine.**—2s. 2d. per lb., in casks.

m-**Xylidine Acetate.**—4s. 5d. per lb., 100%.

Latest Oil Prices

LONDON.—July 19.—For the period ending August 5 (August 19 for refined oils), per ton, naked, ex mill, works or refinery, and subject to additional charges according to package: LINSEED OIL, crude, £62. RAPESEED OIL, crude, £85. COTTONSEED OIL, crude, £52 2s. 6d.; washed, £55 5s.; refined edible, £57; refined deodorised, £58. COCONUT OIL, crude, £49; refined deodorised, £49; refined hardened deodorised, £53. PALM KERNEL OIL, crude, £48 10s.; refined deodorised, £49; refined hardened deodorised, £53. PALM OIL, refined deodorised, £55; refined hardened deodorised, £58. GROUNDNUT OIL, crude, £56 10s.; refined deodorised, £58; refined hardened deodorised, £62 to £63. WHALE OIL, crude hardened, 42 deg., £51 10s.; refined hardened, 46/48 deg., £52 10s. ACID OILS: Groundnut, £40; soya, £38; coconut, and palm-kernel, £43 10s. ROSIN, 30s. 6d. to 45s. per cwt., ex store, according to grade. TURPENTINE, American, 87s. per cwt. in drums or barrels, as imported (controlled price).

General News—From Week to Week

The library of the Chemical Society will be closed for cleaning from Monday, August 7, until Saturday, August 12, inclusive.

Twenty Italian ex-prisoners of war have started work at Dagenham, loading medical supplies for May & Baker, Ltd., says the "*Star* Man's Diary."

The Board of the Institute of Physics announces that ten new Fellows and 27 new Associates have been elected, and 17 Subscribers and ten Students admitted.

The lecture by Dr. D. H. Hey on "Some Recent Advances in Chemistry in Relation to Medicine," delivered on January 10, has been published in booklet form by the Royal Institute of Chemistry.

The chemical exhibition of the Association of Scientific Workers will be on show at Derby Art Gallery from August 4 to August 12. Until July 24 it is at Graves Art Gallery, Tudor Place, Sheffield.

The course in chemical engineering, arranged in May and June by the Birmingham and Midlands section of the Royal Institute of Chemistry proved a great success, and was attended by over 100 chemists, including many holding responsible industrial positions.

A new attraction in the Oxford "Holidays at Home" programme was the holding of a massed brass-band concert in one of the local parks. The bands which took part were those of Morris Motors, Ltd., Miles Aircraft, Ltd., and the Pressed Steel Co., Ltd.

In consequence of the increase in the selling price of crude linseed oil, the Ministry of Food has authorised the following new maximum selling prices: Linseed oil fatty acids: split, £72 per ton; distilled, £83 7s. 6d. per ton (naked, ex works).

The staff of the powder packeting department of Boots Pure Drug Co., Ltd., Beeston Works, Nottingham, have expressed their appreciation of the fine work of our merchant seamen in bringing food and other vital needs from overseas to this country, by a donation of £3 10s. to the Merchant Navy Comforts Service.

Modifications of Berk and Schroeder's methods of determining small amounts of tannin in hard water are described by Haslam, Wilson, and Edwards in *J.S.C.I.* (1944, 63, 6, 179). Their method is based on the reducing action of the hydroxyphenyl group of the tannin substance on Folin-Denis reagent, a complex solution containing phosphotungstate and phosphomolybdate. The reduction product, which is blue in alkaline solution, is determined colorimetrically. Sulphides, ferrous salts, and phenolic matter interfere seriously with the test.

The Coal Tar Products Prices Order, 1944 (S.R. & O., 1944, No. 770), which came into force on July 1, provides for a price increase for bitumen content of road tar in certain cases as provided in Article 36 of the 1943 Order. The increases are as follows: Bitumen content not exceeding 5 per cent., 0.575d.; 5 to 10 per cent., 1.15d.

Evaluation of ferrous ammonium phosphate as a useful addition to metal-protecting paints indicate that it has value under severe conditions of moisture condensation, especially in ferrous metal primers of the zinc yellow type. The mechanism of its action has not been fully established, but its probable function is discussed by Erskine, Grimm, and Horning in *Ind. Eng. Chem.*, 1944, 36, 5, p. 456.

A fuel-economy gramophone record has been prepared by a Birmingham firm, embodying twelve "fuel flashes" divided by a signal and a signature tune. One of these flashes was broadcast to the factory over a loud-speaker system at each rest break. The firm in question—the S.U. Carburetter Co., Ltd., Highlands Road, Shirley, Birmingham—has kindly offered to sell copies of this record to other firms interested.

Grease recovered from sewage sludge has been valued at as little as £10 per ton. Although this low value is caused by impurities which render it unsuitable for many purposes, it has been shown by T. W. Brandon (*J.S.C.I.*, 1944, 63, 6, 185) to possess several possible uses. He estimates the amount of dried sewage sludge obtainable in this country as about ½ cwt. per person per annum.

A chemical worker of Widnes, William Alan Booth, aged 25, was found guilty of murdering his wife on May 27, at Manchester assizes on Tuesday last week. The medical officer of Walton Gaol, Liverpool, described Booth as "clinically insane, but legally sane." In returning a verdict of "Guilty," the jury added a strong recommendation to mercy. Mr. Justice Stable passed a sentence of death, and stated that the jury's recommendation would be forwarded with his own.

The Trading with the Enemy (Specified Persons) (Amendment) (No. 8) Order, 1944 (S.R. & O., 1944, No. 764), adds the names of about 225 firms to the list of traders in neutral countries with whom dealings of any kind are unlawful. The following firms are included: Bollchemie G.m.b.H., Stadelhoferstr. 10, Zurich; International Laboratories, Inc., Place de la Fusterie 9, Geneva; Transpharm A.G. für Pharmazeutische und Chemische Beteiligungen, Glarus, and Gotthardstr. 21, Zurich. About 180 names from previous lists are deleted.

Professor R. S. Hutton, chairman of the council of the City and Guilds of London Institute, asked, at the annual meeting in the Goldsmiths' Hall on Monday, for increased support for the development of technological education, which, he said, was of vital importance to the rehabilitation of the country.

The Secretary to the Overseas Trade Department stated in the House of Commons last week, in reply to questions, that the Export Trade Consultative Committee had no formal terms of reference, but aimed at reviewing, with the senior officials of the Department, methods of improving the services available to exporters. Chemical industry is represented on the committee by Lord Glenconner (C. Tennant, Sons & Co.), Mr. S. P. Leigh (I.C.I.), and Mr. F. C. Oscar Shaw (British Drug Houses).

In his speech at the annual meeting, the chairman of the Distillers' Co., Ltd., Lord Forteviot, announced that the company had acquired the whole issued capital of A. & A. Crawford, blenders, of Leith, and of Mawson, Swan & Carter, yeast distributors, Newcastle-upon-Tyne. He also announced that a fusion was proposed between Gyproc Products (a subsidiary of the Distillers' Company) and British Plaster Board, which would broaden the company's interests in the building industry.

Three memoranda of the Armament Research Department of the Ministry of Supply, dealing with electrodeposition, have now been released for general circulation, revised to January, 1944. These are: No. 1, Notes on the Salvage and Recovery of Overmachined Parts by Electrodeposition (of nickel or, in some cases, chromium); No. 2, Method of Repair of Worn or Overmachined Steel Components by Electrodeposition of Nickel; and No. 4, Method of Chromium Plating Steel Parts to Resist Wear. Application for copies should be made to Armament Research Dept., c/o S.T.A.M., Room 1043, Shell-Mex House, Strand, London, W.C.2.

Foreign News

Large-scale synthetic rubber production is the subject of a sound-film which has been made by the U.S. Bureau of Mines in co-operation with the Goodyear Company.

Eight factories for the extraction of caffeine from maté have been registered with the Brazilian National Maté Institute. Of these, one is in the Federal District, one in S. Paulo, three in Paraná, and three in S. Catharina.

A former jungle area near Nicaro, Cuba, is now producing 5000 tons of nickel ore a day. The ore contains 45 per cent. iron, some chromium and cobalt, and from 1 to 3 per cent. nickel. The deposit is being worked for U.S. Metals Reserve Corporation.

Manufacture of steel drums was started in April by the Industria Brasileira de Embalagens S. A. in a small, well-equipped factory in S. Paulo, Brazil. The plant machinery, practically all of Swedish manufacture, was purchased from a plant at Recife, Brazil.

Mussolini's puppet government is stated to have established a National Institute for the pooling and distribution of chemical products in Nazi Italy. How it will work has not at yet been made known, but a special decree about its work is to be issued shortly.

Reports from Russia indicate that the Dniepropetrovsk coke by-products factory, which was completely demolished by the Germans, has been reconstructed and is now ready to start production, while the Nikopol Manganese Trust has completed full plans for reconstruction work in the Nikopol Basin.

Production of primary aluminium in the U.S. in 1943 totalled 920,179 short tons, exceeding the previous peak of 521,106 tons reached in 1942 by nearly 77 per cent., according to the Bureau of Mines. The 1943 output was valued at $265,380,000, and compares was $151,871,000 in 1942.

An eight-year plan for the reorganisation of industrial development has been drawn up in Portugal. It provides for the manufacture of ammonium sulphate, copper sulphate, cellulose, and artificial manures—all of them are new industries for Portugal—while existing factories for sugar and cement are to be rationalised and modernised.

A graphite deposit at Munglinup, 66 miles east of Ravensthorpe, near the south coast of Western Australia, originally located in 1917, has recently been subjected to full examination. Extensive tests carried out in the metallurgical laboratory of the Kalgoorlie School of Mines has resulted in the production of a high-grade concentrate, together with a satisfactory recovery of the mineral.

Production of tungsten rod and wire in Australia has been developed as a result of the progress made by the Broken Hill Pty. Company in the extraction of highly purified tungstic acid from Tasmanian wolframite. This new advance was revealed by Professor J. Neill Greenwood at a recent meeting of the Australian Institute of Mining and Metallurgy, the professor and his assistants having been responsible for the development.

Producer-gas units continue to be widely used in Sweden, and wood distillate is increasingly employed as a motor fuel. Methane gas produced at the Stockholm sewage plant at Henriksdal is used for propelling a certain number of buses and motor vehicles in the city of Stockholm. Daily production of methane is equivalent to about 2000 litres of petrol. Drastic cuts in the coal ration are expected this month.

Forthcoming Events

A conjoint meeting of the **Manchester** sections of chemical and allied societies will be held at the Engineers' Club, Albert Square Manchester at 6 p.m. on **July 28**, when Mr. H. E. Potts will speak on "Reform of the Patent Laws."

A summer school in X-ray Crystallography will be held in Cambridge on **September 4-16**, on the lines of last year's school. Professor Sir Lawrence Bragg and Professor C. E. Tilley have kindly granted the use of the Cavendish Laboratory and the Laboratory of the Department of Mineralogy and Petrology. The teaching will be carried out by Dr. N. F. M. Henry, Dr. H. Lipson, Miss A. M. B. Parker, Dr. D. P. Riley, and Dr. W. A. Wooster. Those wishing to attend should apply at once for an entry form and prospectus to Mr. G. F. Hickson, Stuart House, Cambridge; entry forms must be returned by **July 24** at latest.

The **Institution of Chemical Engineers** is holding a joint conference with the **Institute of Physics** and the **Chemical Engineering Group** at the Royal Institution on **September 22** and **23**. The subject is "Instruments for the Automatic Controlling and Recording of Chemical and other Processes." Further particulars will be obtainable next month from the Organising Secretary Joint Conference, Institution of Chemical Engineers, 56 Victoria Street, London, S.W.1.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Partnership Dissolved

AGRICULTURAL CHEMICAL CO. (ALFRED BULPITT and WILLIAM BULPITT), Burton Road, Southampton, owing to the death of A. Bulpitt, July 7, 1944. Debts received and paid by W. Bulpitt.

Company News

Vitamins, Ltd., have declared a dividend of 25 per cent. (same) in respect of the year ended March 31. Net profit was £30,933 (£30,064).

United Premier Oil & Cake Co., Ltd., announces a net profit of £36,982 (£32,062) for 1943. The ordinary dividend is 15 per cent. (13¼ per cent.).

The Metal Box Co., Ltd., has declared a final dividend of 10 per cent., plus a bonus of 2½ per cent., making a distribution of 17½ per cent. (same) for 1943. Net profit was £229,579 (£218,881).

Tunnel Asbestos Cement Co., Ltd., reports that no dividend is being paid for 1943 on either the ordinary or the deferred shares. For the 13 months ending December 31, 1942, a 5 per cent. dividend was paid on the ordinary shares.

Beechams Pills, Ltd., again announce a record trading profit—£1,471,560, against last year's record of £1,269,334. Net profit is £373,448 (£452,457), and the total dividend for the year is 32 per cent. (30 per cent.). Of the subsidiary companies, **Eno Proprietaries** are paying an ordinary dividend of 22.4 per cent. (19.4 per cent.); **Macleans** 34.8 per cent. (27 per cent.); **Phensic** 10d. per share (7½d.); **Prichard & Constance** 38 per cent. (60 per cent.); **A. F. Sherley** 38½ per cent. (nil); **Veno Drug** 1s. 11d. (same) per deferred share; and **Yeast-Vite** 16s. 8d. per share (15s.). The net balance of **Beecham Meclean Holdings, Ltd.**, is £248,954 (£195,283), and the distribution is 25.4 per cent. (25.15 per cent.).

New Companies Registered

Obrey, Ltd. (388,603).—Private company. Capital: £1500 in 1500 shares of £1 each. Dealers in essences, lotions, extracts, oils, soaps, perfumes, etc. Directors: D. D. Mathies; F. E. Hargreaves. Registered office: 103 Cannon Street, London, E.C.4.

Sprayed Surfaces, Ltd. (388,583).—Private company. Capital: £1000 in 1000 shares of £1 each. Metal, synthetic rubber and plastic sprayers and platers, engineers, manufacturers of and dealers in electrical goods, paints, cellulose products, etc. Directors: F. Dunden; C. Hope. Registered office: 1 St. Nicholas Buildings, Newcastle-on-Tyne.

Utilex (Moulding Powder), Ltd. (388,607.)—Private company. Capital: £7000 in 7000 shares of £1 each. Manufacturers of moulding powders and derivatives, including cellulose acetate, vinyl acetate, polyvinyl chloride and cellulose acetobutyrate; seamed and seamless containers, etc. Directors: W. P. Lind; S. J. B. Fifoot; L. Flatow; T. H. Wilson; D. S. Pond; and L. J. Adkins. Solicitors: Denton, Hall & Burgin, London, W.C.1.

Chemical and Allied Stocks and Shares

GENERAL conditions in stock markets have remained unchanged, reflecting absence of selling in most sections, with prices showing ready response to any improvement in demand. Industrial shares were again the chief centre of attention, while gilt-edged stocks also continued to show an upward trend. Imperial Chemical remained firm at 40s. 3d., while Courtaulds at 60s. more than recovered deduction of the maintained 2½ per cent. interim dividend from the price. Turner & Newall showed firmness at 85s. 6d., and Triplex Glass were firmer at 42s. 3d., as were United Molasses at 38s., Wall Paper Manu-

facturers deferred at 43s. 9d., and Dunlop Rubber at 46s. 6d.

British Plaster Board were prominent at 38s. on the full results and the further details of the company's important deal with the Distillers Company's Gyproc subsidiary. The market is assuming that the set-back shown in British Plaster Board's profits for 1943 will be largely regained in the current year owing to increased demand for its products in connection with building repair and kindred work. British Aluminium strengthened to 50s. 3d., British Oxygen to 84s., and General Refractories to 18s. 6d. Remaining under the influence of the full results, the units of the Distillers Co. further strengthened to 101s. 6d. Moreover, Lever & Unilever, favoured on encouraging views of post-war prospects, rose further to 42s. 6d., while Lever N.V. were 40s. Firm features in other directions included Associated Cement at 69s., British Portland Cement at 105s., Tunnel Cement at 57s. 6d., Lewis Berger at 108s. 6d., and Pinchin Johnson 10s. shares at 40s. 6d. Metal Box were firm at 93s. xd. on satisfaction with the maintained distribution.

Yield considerations continued to attract buying of iron and steels, with Guest Keen 40s. 9d. on satisfaction with the results, Consett Iron 6s. 8d. units 9s. on the full report, and Dorman Long 28s. 3d. Allied Ironfounders further rallied to 51s. 6d. Babcock & Wilcox at 55s. have again moved higher, as have Stewarts & Lloyds at 58s. 1½d., and Tube Investments at 100s. 6d. Richard Thomas 6s. 8d. units were better at 11s. 3d. Reflecting the increased attention given to Indian securities, Indian Iron shares moved up to 60s. 7½d. Elsewhere, Gas Light & Coke ordinary were better at 21s. 3d., while Low Temperature Carbonisation 2s. units strengthened to 3s. under the influence of the results. British Glues & Chemicals 4s. ordinary kept firm at 9s. 6d., while British Industrial Plastics 2s. shares kept at 7s. 6d., and Erinoid 5s. ordinary at 11s. 6d., while De La Rue were 185s.

In textiles, Bleachers were 11s., Bradford Dyers 24s. 4½d., and Calico Printers 17s. Influenced by the results and higher dividend, United Premier Oil 5s. shares further improved to 13s. 3d. In other directions, William Blythe 3s. ordinary kept firm at 9s. at which the yield is 5 per cent. on the basis of last year's 15 per cent. distribution, which was well below actual earnings on the shares. At Sheffield, Newton Chambers were bought on yield considerations and further improved to 60s. Last year's distribution on these £1 shares was 15 per cent., so that the yield in this case is also 5 per cent. B. Laporte were firm at 85s. as were British Drug Houses at 26s., and Burt Boulton at 24s. Mousanto Chemicals 5½ per cent. preference were again 23s. Greeff-Chemicals 5s. ordinary were 8s. 3d., and Borax Consolidated 38s. 7½d., while British Match further strengthened to 42s. 3d. Barry & Staines showed firmness at 50s. 6d., as did Michael Nairn at 78s. 9d.

Boots Drug showed strength at 54s 6d., while Timothy Whites were 36s. 3d., Sangers 26s. 10½d., and Beechams deferred rose further to 18s. 10½d. on the full results. Imperial Smelting were well maintained at 14s. 7½d., as were Amalgamated Metal at 18s. 9d., while Staveley ordinary further rose to 55s. 6d. Oil shares were generally firm, with "Shell" 85s., Anglo-Iranian £6, and Burmah Oil 88s. 9d.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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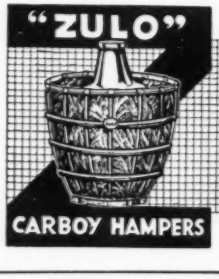

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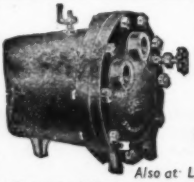

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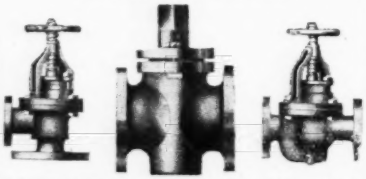

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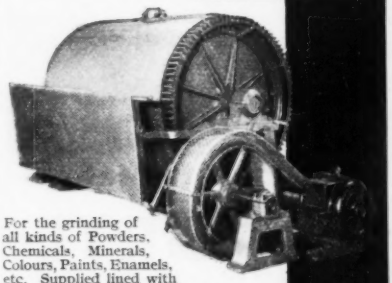

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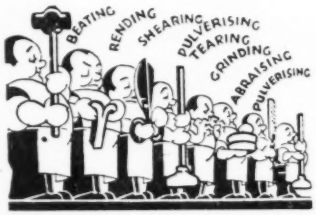

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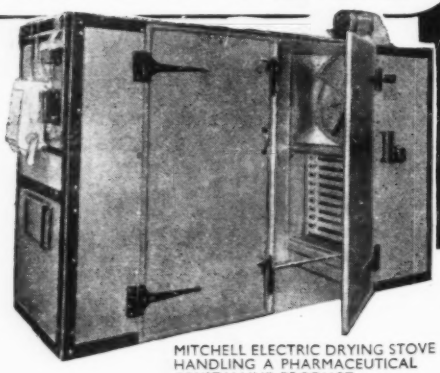

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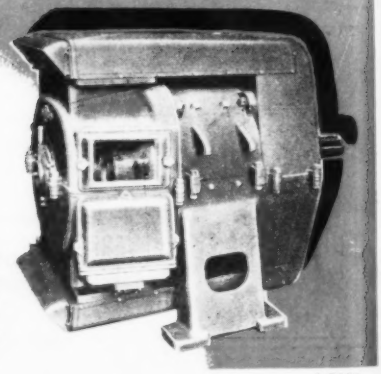

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